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DESULTORY HINTS TO FARMERS—LABOR-SAVING, &c.

BY HORACE GREELEY.

[In the protracted absence of the Editor on a most interesting and gratifying Southern tour, one of the Publishers is impelled to put forth some crude suggestions regarding Agriculture in this Number of the Journal. As they may pass through the press before the return of Mr. SKINNER, the reader will be so just as not to hold him responsible for any error they may contain.]

WHEN I was a lad ten years old, my father took a job of clearing fifty acres of low, wet land in Vermont, which had originally been a pine forest, with a considerable proportion of black ash, &c. (probably a later growth,) but had more recently been overrun with fire in an extremely dry season, and was thickly covered, among its mostly dead and decaying timber, with an undergrowth of blue beach, alder, &c. &c. This clearing was a miscellaneous undertaking. Commencing in March, the whole tract was covered with water knee-deep, held there by the masses of fallen and decaying pines, the roots of the still standing trees, &c. We were visited while at work there by a good many neighbors and wayfarers, who comforted my father with the assurance that he never could accomplish what he had undertaken—that his boys, of ten and nine years respectively, would be 'out of their time' before he could finish it. He persevered, however, with the help of these boys, and completed the job in about two years. When it was done, and we had a chance to look back upon it, I could not help seeing that about one-third of our work had been positively wasted, and might have been saved by adequate knowledge. Half the labor was devoted to cutting up the great pines so that they might be hauled together and burnt, to digging out the rotten wood from the earth in which it was nearly imbedded, &c. which might have been entirely avoided. Had we been wise enough to cut down every green tree and bush to begin with, take out whatever was worth preserving for timber or fuel, then clear a wide space between our tract and the adjoining wilderness, and, in the very dry season which rarely fails to come once in a Summer or Autumn, had simply mowed some of the swamp-grass, weeds, &c. which grew in all the open spaces, and put it in the fire, we should have been saved months of rugged toil.

This experience has led me since to regard with interest the works and ways of Farmers in subduing and cultivating their lands, and my impression is that *one-third* of the labor thus bestowed is absolutely thrown away. More thorough and general knowledge of the laws of Nature and the means of subjecting her powers and processes to the use of Man would save at least this much, and in time probably more. Let me indicate a few particulars in which such improvement has already been made as to give promise of much more:

Hoeing Corn and other planted crops was formerly the chief business of New-England Farmers through June and a good part of July. Each field must be gone over with the hoe from twice to four times, requiring a great outlay of time and effort. But experience has shown that the corn-plant, like others, knows about how deep to root itself in the earth without extraneous assistance, and that the Plow or Cultivator can perform nine-tenths of the work formerly entrusted to the Hoe at one-fourth the expense. Of course there are soils which re-

quire more or less labor with the hoe, but the general truth still stands, that an immense amount of labor formerly performed with the Hoe either is or may be saved. Doubtless, implements will yet be invented, improving on the plows and cultivators now in use, which will greatly diminish the amount of human labor still requisite in the culture of planted ground.

Sowing Grain on tolerably smooth ground is a process which the slightest consideration must commit to the proper domain of machinery. Sowing by hand is not only a slow process, but so imperfect and capricious that far more seed is required than would be if each grain were placed just where one should be and none elsewhere. Accordingly I observe a statement in the papers that a machine has been invented in England whereby half the seed is saved, with still more of the labor of sowing, while the work is far better done and the yield consequently greater. It is a shame to our farmers that they have waited for this invention to be made across the water. Our Western prairies are naturally the finest grain-fields in the world, and afford the fullest scope for the inventive genius of the husbandman. There the greatest improvements in Grain Culture should originate or at least be promptly adopted and improved upon, and this among them. It seems to me practicable to construct a machine which will combine the processes of Sowing and Harrowing in, so that each seed shall be placed at proper distance from every other, covered to the proper depth and no more, and all be accomplished with less labor than is now required merely for covering, so as to save altogether the labor of sowing and half the seed usually sown to the acre. And even this should not satisfy the cultivator of the spacious, fertile, mellow prairies. Why should not Corn be dropped and covered by a similar process? We might thus give to each kernel a due distance from every other in the hill, which is but occasionally effected now, could plant the five or six kernels in a hill in the precise form of a cross, a square, a circle, or any other that might be deemed best, and place every row and hill at exactly equal and the proper distances from every other. I am confident there is a chance for improvement here, whether my hint toward such improvement be worth anything or not.

The substitution of the Cradle for the Sickle, the Threshing-Machine for the Flail, the introduction of the Fanning-Mill, &c. into universal use, have effected similar savings. The labor required to produce a thousand bushels of the various grains is probably a third less than it was forty years ago. Yet improvement has been made slowly and with difficulty, in the face of obstinate prejudices and a more culpable indifference or incredulity on the part of most Farmers. Even now, with the trophies and substantial fruits of past triumphs all around them, the mass of farmers hardly believe that their calling is susceptible of farther advancement, though to the observing mind it must be evident that the work has just begun.

Breaking Flax and other fibrous plants was formerly one of the most toilsome and tedious pursuits of the farmer, and at last, owing to improvements in the culture of Cotton and the consequent cheapening of the product, Flax has almost ceased to be raised here for the fibre. I know that good farmers have sown and harvested many acres of it in years past for the seed only.—Yet there was exhibited at the last Fair of the American Institute a combination of machinery, patented by a Mr. Billings of Missouri, whereby Flax or Hemp may be thoroughly broken and cleaned at a cost of one cent per pound, and with an immense saving both in the quality and quantity of the fibre. The rotting is performed in two days in vats of *warm* water, heated from the fire under or about the steam engine which propels the machinery, and no man need be told that the fibre is stronger and brighter than where months of exposure to the caprices of the elements are devoted to the rotting process. The saving in quantity is estimated at twenty per cent.—the woody substance being detached from the fibre with a slight and uniform application of force instead of the hacking and mangling of the old "flax-break." I do not see why this machinery should not work an industrial transformation equal to that effected by its predecessor the Cotton-Gin, especially as the spinning of Flax by machinery is no longer deemed impossible. It is now done regularly in Connecticut as well as over the water, and doubtless will be brought gradually to a state of efficiency and perfection equal to that attained by the Cotton manufacture.

And this naturally leads to the reflection that every new achievement in Labor-Saving suggests farther and still farther triumphs. If one of these Flax-dressers were conveniently located in each township where Flax might be advantageously cultivated, I cannot doubt that its operation and primary use would speedily suggest many other uses of the same or similar machinery, to some of the neighboring farmers. The steam-power, the rotting-vats, the breaking and dressing machinery, would either be applied directly each to some other desirable end in farming economy, or it would suggest machinery based on similar principles and employed to produce different but equally desirable results. Thus a machine invented to dry Cane Sugar by a rotary blowing process, having proved deficient in power for that purpose, has yet been applied to other purposes with decided success. I have seen it employed to dry

rinsed clothes in a great Washing establishment, and was assured that it performed admirably. The mighty progress of Invention during the last half century has yet been a gradual, step-by-step advance. There probably never was a man with genius sufficient to have invented outright one of the power-looms now used in the manufacture of the richest Carpets, Shawls, &c. To construct a modern Steamship would have defied all the power and skill of Archimedes. From the first rude conceptions of Fitch or Fulton to a steamboat like the Oregon or St. Nicholas is a distance not to be traversed by any one intellect. It has been traversed, however, in a moderate lifetime, by the successive improvements of one man on the suggestions of a predecessor and so on. In Agriculture only is this advance halting and capricious. Half the meadows and grain-fields as level as a house-floor are still harvested by scythes, cradles and rakes, although the facility of attaining the same results by the best machinery with half the labor has been abundantly demonstrated.

The slowness with which improvements are adapted by the most of farmers spring from two causes, want of means and want of knowledge. The plow-jogger who barely and hardly lives by scratching the face of Nature will tell you, if pressed, that he knows that Deep Plowing is the correct course, but what is he to do with his one light, gaunt yoke of cattle, that had to browse half the winter for want of hay, or his skeleton span of horses, that are just able to hold each other up by the help of the harness? He would like to cover his land with lime, guano or some other fertilizer, but then he has n't money to buy it nor even time and team to draw the muck out of his own swamp-holes, where it has lain from time immemorial, loading the summer air with noxious vapors to poison the health of his family. He would like to farm better, but the sheriff and the tax-gatherer are on his track, and the mortgage on his farm (if it is not a leased one) warns him against devoting too much time to costly improvements of which the benefit cannot all be realized this year. So he worries on, skinning his starved acres by the help of his starving brutes, until the sheriff steps in and turns him off to seek in the Far West some region where the rewards of good farming can be enjoyed by bad, shiftless farmers. If any body knows where that region lies, let him proclaim its whereabout speedily, so that the men who belong there may go at once. As it is, there are thousands who began in New England, moved thence to Western New-York, afterward to Ohio, then to Michigan, next Illinois, are now in Iowa, and mean to start for Oregon as soon as they can compass an outfit—all along cursing their hard fate in being trained to so poor a business as Farming, and grumbling at the great profits of merchants, manufacturers, &c. when in truth farming is the only business by which they could have earned a livelihood at all. If almost any other business were followed as ignorantly, carelessly, *shiftlessly* as Farming quite commonly is, those engaged in it would break the first year. No mechanic or manufacturer could afford to neglect or misimprove his advantages as half the farmers habitually do theirs.

Want of Means is often a real but sometimes an imaginary or avoidable clog on the farmer's energies. He who has little or nothing to do with can only do the best he can; though even he may find means by taking just the right course. Whoever clings closely to the region wherein he is best known and rigidly maintains a character for integrity, industry and economy, need not long stand in need of any requisite means. But let him be careful not to involve himself for any thing more than he actually does need. Many a farmer staggers through life under an outlay of $3,000 for a farm when his labor well bestowed on half as much land would have ensured as ample a product and saved him $100 a year in interest (or rent) and taxes. And now if our indebted farmers, who are worrying along on a hundred to two hundred and fifty acres each of land, would just let half or two-thirds of it go, pay off their debts, resolve to be henceforth 'forehanded' by keeping no more land beside a small wood-lot than they can fertilize thoroughly and work faithfully, no intelligent person can doubt that immense benefits would result to them and to all. The same area of soil would support twice the present agricultural population, giving extensive employment for years to brickmakers, lumbermen, house-builders, cabinet-makers and mechanics generally. The distance between each farmer and his merchant, blacksmith, shoemaker, &c. would be greatly reduced, and schools for his children would be brought gradually nearer and nearer his door. This process of relieving farms from mortgages and other incumbrances by dividing them, at the same time by superior culture trebling and quadrupling the aggregate product, ought to be encouraged and accelerated. The cultivator will never improve a mortgaged or leased farm so heartily as he will once that he owns and may transmit to his children beyond peradventure. Before we can have the harborer of any nuisance like the Canada thistle or the producer in a good season of ten bushels of corn or half a ton of hay to the acre indicted by our Grand Juries as he should be, we must have unencumbered farms, and the owners cultivating them. There are able, enlightened men capable of managing larger Estates efficiently, but these are comparatively few.

But want of adequate Knowledge is a far more general and crying evil among farmers

than want of Means. I have no ability to supply this want, and pretend to none. The suggestions I venture to make at all are offered with extreme self-distrust, and are subject to the correction of every practical farmer. Yet can it be presumption in one who knows that one hundred bushels of Corn or three tons of Hay may be and often have been obtained from an acre, yet sees that the average yield is not more than one-fourth so much, to say that there is grievous deficiency somewhere? And when I have seen farms once fertile and productive rendered sterile and worthless by shallow plowing, no maturing, and shabby cultivation, until fields which once bore good Wheat have been sowed over and again with Rye until 'ryed out,' the product falling to five or six bushels per acre, and naturally the best meadows in the world mowed and fall-fed, and spring-trampled, until hardly enough grass could be obtained from a swath to wipe the mower's scythe, it surely is not presumption, comparing these with the opposite results of good farming, to say that this is the result of wretched husbandry and should be amended.

If want of Knowledge has afforded it surely can no longer afford a tolerable excuse for poor farming. The Agricultural Clubs which have been formed mainly in our cities may readily be copied and improved upon in every rural School District throughout the Country. There is no observing farmer or farm-laborer, however illiterate, whose experience may not afford some fact or hint of value to his brethren generally — Let the farmers of any School District meet statedly once a week or month (in the winter once a week cannot be too often) to compare observations, give the result of experiments, exchange seeds and cuttings, and read choice extracts from the best new works, and there cannot fail to result a decided and obvious improvement in the farms, the products and the farmers of that District. The boys, allowed to come in as listeners, will imbibe the spirit of the meeting, and be imbued with a laudable pride in and liking for their fathers' noble vocation. Many of them will learn more that is of substantial use to them in four years through such meetings, than they would by spending that time in College, though this also is desirable for some. They would learn to observe the processes of Nature and Industry going on around them, the value of Science and Knowledge, and gradually acquire the habit of expressing their ideas correctly, fluently and forcibly. They would learn to value their homes and the privileges therewith connected, and not pine to hurry away to Texas or Lake Superior in quest of some excitement or peril to relieve the tedium of common life. A Farmers' Club in each School District, with all the farmers participating in its advantages, would be worth more than a gold mine in each County of the Union.

From such a Club many incidental advantages of a pecuniary kind would naturally flow. The farmers thus statedly assembling would gradually fall into the habit of uniting in various enterprises of mutual interest; they would combine to purchase new implements or machinery needed by all yet costing more than any one could afford to expend for such a purpose. Thus Mowing and Harvesting Machines, Stump Extractors, &c. with many others, would be brought gradually into use where they otherwise might not be. One or more intelligent members would be deputed to attend the meetings and Fairs of County and State Societies, to visit and examine expensive new implements, &c. and report to the next meeting. Very likely, in case they were largely interested in any one branch of Industry, they would depute one or two of their number to go to market for the whole, as I observe by an advertisement that the Dairymen of Herkimer County in this State maintain a regular Society, with President and other officers, for the purpose of selling to the best advantage their Butter and Cheese. The vein here struck leads, who shall say whither? Enough that it well repays the labor of working, and may at any time be abandoned.

The farmer's life is shunned or loathed by many because it seems one of mindless drudgery. It ought not to be so. If half our farmers would study and reflect more, they might do less hard labor and yet accomplish more in the course of a year. Ten hours' work a day in summer and eight in winter ought, with good management, to give any man a good living. He who works so hard that he cannot read or reflect after the labors of the day are over because of fatigue, does not plan wisely. Let no man shun work when work should be done, but to delve, delve forever is not the end of a man's life. The farmer's evenings should be devoted to mental acquisition and rational enjoyment. To sup and tumble into bed is a hog's fashion, and highly injurious to health. But let the farmer have about him the choicest works on his own and auxiliary vocations; let these form the subject of study and conversation at least two evenings in the week, while the newspaper, the newest volume and the Oldest Volume also, have each their allotted season. Two or three dollars contributed by each family in a neighborhood or school district would go a great way in the purchase of standard books at modern prices.—These are but hints, which each reader will modify as his judgment shall suggest. I plead only for the essential thing of making Home pleasant and its hours of relaxation hours of instruction also.—But it is high time I had brought these rambling suggestions to a close.

TEXAS: ITS SUGAR LANDS, SOIL, &c.

OBSERVATIONS ON THE ORATION OF JUDGE ROST, DELIVERED BEFORE THE AGRICULTURAL AND MECHANICS' ASSOCIATION OF LOUISIANA,

May, 1845, *and first published in the* FARMERS' LIBRARY AND MONTH. JOUR. OF AGRICULTURE.

To JOHN S. SKINNER, ESQ.
Editor of the Farmers' Library.

THIS interesting discourse republished in the N. O. Bulletin, of the 27th of October last, is well worth the perusal of Sugar planters and of persons disposed to go into the culture of Sugar-Cane in Texas. It contains much valuable information and generally to be relied on, being sustained for the most part by "facts, careful observations, and practical results." But the learned Judge has fallen into a grave error in stating that Sugar-Cane will not rattoon on Galveston Bay; and he quotes Mr. J. C. Marsh as authority for this statement. Now so far is this from being correct, there is at this time growing on the immediate margin of Galveston Bay, on Col. Morgan's plantation, Sugar-Cane which has rattooned the *fourth* year. The third year of its rattooning, a number of stalks were taken to Galveston and exhibited in Shaw's Hotel, where they were seen by hundreds of persons, which had matured for seven feet. And the two preceding years the Cane had matured to an equal hight. In 1830, '31, and '32, Judge Williams cultivated Cane successfully on the Trinity, 20 miles from Galveston Bay, and the rattoons of the third year were equal to the growth of the first year; and the Sugar made by Judge Williams was equal to any ever imported from Louisiana. On the Caney, 40 miles from Galveston Bay, Mr. Duncan, Mr. Sweeny, and others, are now cultivating the Cane on a large scale, and with great profit. It will be an easy matter to ascertain from these gentleman whether Cane will rattoon in this neighborhood or not. Mr. McMillan, near Houston, 20 miles from Galveston Bay (its neighborhood) has Cane which matured last year, and the present, which is the fifth of its rattooning, seven feet high. It is a well-ascertained fact that the Sugar-Cane grown on the prairies near Galveston Bay furnishes more saccharine matter than that grown on the bottom lands, though it does not attain to so great an elevation as the latter. Yet some that was grown on the plantation of Col. Morgan already alluded to, was pronounced by a gentleman from the West Indies, equal to any Cane he had ever seen growing there. Col. M.'s was the ribbon Cane and the third year of its rattooning. The Cane of Mr. Sweeny's plantation on the Bernard has rattooned, I am informed, the sixth year The Sugar made by Mr. Duncan, who likewise plants on the Bernard, was considered in Galveston equal to any ever imported from New-Orleans. I might cite facts indefinitely to prove the incorrections of Judge Rost's statement concerning the Sugar lands of Texas generally and of Galveston Bay in particular. Mr. J. C. Marsh, therefore, if indeed such a person ever "planted in the neighborhood of Galveston Bay," has led the learned Judge into an error of fact. No planter of this name has been known or heard of in this vicinity by any of the inhabitants living here for the last fifteen years. I have, however, heard that a gentleman of this name is planting in Attakapas, Louisiana. But it is quite immaterial who is the author of the erroneous statement; my object is only to set forth the facts.

The Orange flourishes in high perfection in Galveston Bay. I lately visited New Washington and found the orange trees in Col. M.'s grove loaded with large fruit of delicious flavor. This grove stands on an elevated bluff exposed to the north wind, without the smallest protection, yet it was uninjured during the recent severe weather, which was the coldest that has occurred in this section since the winter of 1837-38. It surely will not be contended by the learned Judge Rost that the *climate* is too vigorous to allow the cultivation of the Cane.

Galveston Bay is a broad, irregular sheet of water extending from the Gulf some 30 or 40 miles into the interior of the country. Into the head of the Bay, on its north-east and north-west corners, the Trinity and San Jacinto rivers respectively discharge their waters. On the margin of these rivers are rich alluvial bottoms varying in breadth and abounding in Cane and the various trees of the growth of these latitudes, and furnishing most ample supplies of wood for timber and fuel. I may mention as a fixed point that New Washington, situated at the mouth of the San Jacinto, is nearly in latitude 29° 30'. The country bordering Galveston Bay and for a distance more than 30 miles into the interior, is of diluvial formation. The soil is from one to three or four feet deep, and reposes on a subsoil of clay containing considerable quantities of

cretaceous matters and from 30 to 80 feet deep. I derive these last numbers from wells which have been sunk on the immediate margin of the Bay, as well as 20 miles interior, at Houston for example. In no case, as I am informed, has the solid rock or a bed of sand been reached. The cretaceous matters have been found in considerable quantities from very near the surface to the greatest depths to which the earth has been penetrated. These cretaceous matters consist of partially decomposed marine shells thickly disseminated through the earth, and the abundant mineral matters which their presence indicates, must be a source of great fertility to the soil. The cretaceous matters are not so abundant as with the argillaceous matter to constitute marl, nor does it exist in the form of lime, as in the Alabama and Mississippi prairies; where, besides other inconveniences, it is destructive to the feet of plantation animals. But there are adequate quantities of this essential component of fertile soils, and as it shall be exhausted by cultivation, it can be restored by deep plowing. I have mentioned that the soil varies from one to a few feet in depth; in color, too, it varies from an intense black to a brown in proportion to the quantities of *humus* or vegetable mould which it contains. In the cedar brakes where the herbage is not consumed by the fires to which the prairies are subjected, the quantity of vegetable mould in the soil is very great, and the color of the earth of an intense black. This is true in a less degree of the other timbered lands. Some of the open prairies resemble in respect to the quality last mentioned the cedar brakes, being protected in a similar manner by growths, one of the most abundant of which is an annual plant six to seven feet in hight, of the order of acacias. The soils vary in tenacity, but the most tenaceous, on being turned up and exposed to the weather, crumble and work light.

It would be out of place here to enter into any consideration of the advantage respectively of cultivating a plantation of prairie, or bottom, or timbered land, when the plantation is to be opened, for the superor fertility of the latter lands is admitted by all. The Galveston Bay lands offer a choice to the judgment of the planter; their fertility is known to all who have cultivated them. Their productions are Sugar, Tobacco, Cotton, Corn, etc. The Orange, Peach, Fig and Plum flourish in perfection.

The borders of the Bay furnish abundant supplies of wood for fuel for Galveston City; and, including the wood on the Trinity, San Jacinto, Buffalo Bayou and numerous small streams, the quantities are inexhaustible.

Galveston Bay, Buffalo Bayou, San Jacinto, and Cedar Bayou offer the great facilities of a perfectly safe and convenient navigation every day of the year: and the Trinity is navigable for 500 miles a considerable portion of the year. All these waters abound with fish of fine varieties; the coves are alive with swan, geese, brant, and ducks during the winter months; oysters of excellent quality and abundant, a few miles down the Bay; and the prairies and timbered lands furnish excellent range for horses and horned cattle, and roots and mast for hogs.

In health, the margin of Galveston is unsurpassed by any country under the same latitude; and for beauty of picturesque scenery it vies with the most renowned spots of the earth.

To the planter, then, of Sugar, Tobacco, Cotton, or Corn, Galveston Bay offers large crops, convenience to market, with healthfulness and beauty of situation.

Galveston, Feb. 9, 1846

TOWN SEWERAGE.

THE question has been raised by an active member of the Agricultural Association of New-York, as to the practicability and value of turning the Town Sewerage of this City to horticultural purposes—our position lately has not enabled us to know the result of their inquiry. All things cannot be done at once. The world itself was not made in a day, but all cities that promise population and extension, should look ahead to the conversion to some useful purpose of all the offal of every kind which large populations throw off every day—and which too often become sources of malaria and pestilence, instead of wholesome subsistence.

"Were Glasgow properly washed out, I should judge the washings capable of irrigating at least 15,000 acres—a square of five miles; and this, at £30 per acre, would be worth £450,000; or, at only £20 per acre, £300,000 yearly. Taking into account the population of Glasgow, these sums are considerably under what Liebig allows. We should have here a stream of dirty water running out from the City, to return again in a stream of milk—a transformation effected by the mysterious metamorphic power of combined vegetable and animal assimilation. No doubt a large outlay of capital would be necessary, in the first place, to bring in and distribute a sufficiency of water over the City, and to effect a complete drainage; and in the second place, to raise the collected washings, conduct them by aqueducts to the proper distance, and spread them out in a complete net-work of irrigation; but the exuberant fertility which would thence be extended over a large space of country would more than doubly compensate the amount of outlay, while the improvement which would be effected in the health and even in the morals and character of the population of Glasgow would be inappreciable. In the event of this improvement being carried out generally, our beautiful rivers and streams, which now as they pass our cities and populous villages, suffer pollution by the drainage, would continue to run in crystal purity to the sea, sweet as when they first welled out in the fountains and springs from the bosom of our pastoral hills."

[Mr. Matthew, in the Glasgow National.

FRIENDLY HINTS ON A VARIETY OF SUBJECTS.

To JOHN S. SKINNER,

Editor of the Farmers' Library:

I HAVE carefully read all the Numbers which I have received of your valuable periodical, with the greatest interest and pleasure; and I congratulate you, my dear sir, both on the style of your publication and on the matter you have infused into it. It is precisely the kind of work much wanted by the great body of the agriculturists of this Country, and is well adapted to the rapid advancement, at this itme, of agricultural knowledge. It is elementary, scientific, miscellaneous and practical.

I have been particularly impressed with PETZHOLDT'S LECTURES ON AGRICULTURAL CHEMISTRY. They are written in a plain and scientific style, and in the true spirit of inductive philosophy, although I think some of his deductions are not quite legitimate. He is entitled to the rare praise of having managed to invest his subject with a deep interest by avoiding, as far as practicable, the use of technical terms, and of having succeeded in making his definitions and explanations easily comprehensible to the most unscientific reader. They may be, it is possible, too elementary for many persons, but that very fact must recommend them to a majority of your subscribers. Petzholdt's fault, perhaps, is, that like all men of science, he claims too much for his own peculiar department. I question very much whether *productive farming* can ever be prosecuted according to strict chemical rules, for there must be a limit to their application, and that limit is the *vital principle*. The properties of organic bodies, animal and vegetable, their phenomena, and the laws which control their action, belong rather to the Science of Physiology, while Chemistry is more particularly applicable to inorganic matter. I do not, however, by these observations, mean to underrate the value of Chemical Science. Agriculture is greatly indebted to it for its rapid progress and improvement, and is destined, I hope, to derive farther benefit from its researches. Still I cannot but entertain the opinion that there are numerous phenomena connected with vegetation and the influence of manure, which entirely elude chemical investigations. Their operations are different from those of the laboratory, and cannot be completely subjected to its laws. Petzholdt himself calls Agriculture an *Art* as well as a *Science;* and I imagine that much of its most valuable *practice* with culture to be the result of pure inexperience: the best system of cultivation in the world is to be found in Belgium and China, and the lands in these Countries have been tilled with the same kind of implements and on the same plan and rotation of crops for ages.

Our experience in this part of the Country, does not confirm Petzholdt's Theory of *Fallow;* but, on the contrary, if I understand it, is in contradiction of it. We have, strictly speaking, no fallow, as our fields are never idle. Our rotation is almost uniformly as follows, viz.: Clover, Wheat, Tobacco, and Corn, Wheat, Oats, and Clover. This system, with plaster sown in the Clover, was introduced nearly 50 years ago, in the form which I have mentioned, by Mr. John Galloway, as a substitute for the *old fallow-field* course, by which the lands had been *impoverished*. There can be no doubt that the present comparative fertility of our fields is due to Mr. Galloway's system—that is, to the substitution of the fallow-crop for the fallow-field; for you are aware that, owing to a most criminal neglect of stock-raising, and of the ordinary care elsewhere bestowed on the collection of manures and the formation of composts, the amount of manure returned to the soil is quite insignificant, except that which is hoarded for Tobacco beds: yet I believe there has been, and still is, a progressive increase of fertility in our lands, and I fancy that the crops, in this neighborhood, of our great staples, Wheat and Tobacco, were larger in 1845 than in any other previous year within the memory of man. Petzholdt says "the soil after *pure fallow* is more productive than after *fallow-crops* have been cultivated:" and this, it must be confessed, is a fair deduction from his premises. Nevertheless, we have greatly improved our exhausted lands, by the substitution of fallow-crops for pure fallow. The plaster has, doubtless, exerted some influence in producing this amelioration, but, it is believed, not from its direct action on the soil, from the fact that no great benefit has been observed to follow its application to the land, or to other crops than Clover; and the opinion is here pretty generally entertained that its principal advantages result from its beneficial effects on Clover.—Certainly it does not produce the same effects on land where Clover is not cultivated as a fallow-crop.

I shall not pretend to point out the precise manner in which Clover acts as a fertilizer—but it is most likely by drawing the alkaline silicates from the subsoil nearer to the surface. I cannot however, agree with one of your respectable contemporaries who speaks of restor-

ing to the land in a measurable degree, by the use of Clover, the alkalies of which it has been deprived by injurious cropping, "as every crop of Clover turned under will, by the process of decomposition, to which it will be subjected by the action of time. *generate* more or less of those essential elements [the alkalies] in every good soil." Surely he cannot mean to say that plaster, clover and lime possess the power of *generating* the alkalies by the same occult and mysterious process—by some alchemical operation! And yet such is the obvious import of his language, for, in the same article, he speaks of "a *creation* [by those agents] of a new supply of potash for the plants to feed on." And again he says—"Ashes, as our correspondent knows, is produced by the burning of wood, and *lime* produces in the earth a *combustion*—slow, to be sure, but still such a combustion as, in its chemical effects, among other things produces *potash*, and hence it is that lime, clover, and plaster act so as to keep up the supply of potash in Tobacco culture." The last quotation may serve as a key to the whole article, the meaning of which I take to be this, "that by the combustion, decay or putrefaction of vegetable matter, the potash *previously existing* in the plants is eliminated. The obscurity of meaning to which I have alluded as an illustration of what I deem to be a great evil of the present age, is owing, I am sure, to the careless and unphilosophical language employed; a fault which cannot be too sedulously avoided by those who write for our instruction. I have also recently noticed another instance of the improper use of scientific terms, in which a writer speaks of carbonic acid as "*a poison.*" Nothing can be more incorrect. It may be taken into the stomach, as every one knows who has ever drank a glass of soda-water, with perfect impunity. It is true that the animal confined for a considerable length of time in an atmosphere of carbonic acid gas, will be *deprived of life*—and it is equally true that immersion in water, or hanging by the neck, will produce the same effect; but we would not say that a man who was drowned or hung had been *poisoned.*

Sufficient importance is not attached to the use of lime, as it regards the culture of Tobacco, when its principal advantage is attributed, as we sometimes see, to its action on inert vegetable matter and to its power of eliminating potash by a slow combustion; for Tobacco is essentially a *lime plant*, requiring more of that earthy alkali as a constituent, than any other cultivated plant of which I have any knowledge. Lime has been applied to our lands in very limited quantities, but always with wonderful success. Oyster shells may be otained for 1½ to 2 cents per bushel, and the cost of burning (when your own force is not employed) including the cutting of the necessary wood, is about the same. I prefer shell to stone lime, as it contains nearly 1½ per cent of phosphate of lime, a rare and valuable salt. I spread 12,000 bushels of shell lime in 1844, and the increased value of the next crop, I believe, paid all the moneyed expense. This is the opinion of my neighbors, whose opportunities of judging were better than my own.

One word on the subject of *Guano.* I have tried it on Corn, Wheat, Tobacco, and Grass—in the garden, on grape and strawberry vines, in ornamental flowers, and on culinary vegetables. It has applied in solutions, in slight rains and after showers in the autumn and in the spring—pure and mixed with plaster—in quantities varying from 150 lbs. to 300 lbs. to the acre, but with scarcely any effect perceptible to the eye. Some improvement, it was thought, was observed in the Tobacco beds. The Guano was used either under my own notice or under the direction of the managers, your old acquaintances, Tucker and Purdy; and all the precautions usually recommended for its application, were carefully observed. Why it so signally failed with me, when it has been so eminently successful elsewhere, according to authentic reports, I will not pretend to say—I certainly gave it a fair trial. The article was procured in Baltimore, the greater portion of it through the kind instrumentality of Mr. George Law, and was undoubtedly, pure, unadulterated *Peruvian* Guano. I am told that the last season was unfavorable to the action of Guano, but surely if its good effects are so contingent it must be too expensive except to the wealthy gentleman, who looks to farming as a fashionable recreation (for there is a fashion in all these things) than as a laborious occupation from which he is to support his family.

The soil of the West River District has never been analyzed that I am aware of, but it is obviously rich in the silicate of Potash. The best manure we can use (after carefully collecting the products of the stables and barn-yards,) is undoubtedly *Poudrette*, properly prepared: that is, with gypsum, sulphate of lime or sulphuric acid, and not with carbonate of lime which is the common way. Petzholdt seems to forget that human fæces are always mixed with large quantities of urine, the carbonate of ammonia of which would be converted into a soluble sulphate by the employment of gypsum or the other substances above mentioned.

It has been my intention to prepare for you a design for Farm Buildings adapted to Mary, land and Virginia cultivation, as soon as I can find the leisure, and if it will answer your purpose you will be heartily welcome to it.

Very respectfully, your obt. servt.

GEO. W. HUGHES.

West River, Md. March, 1846.

STEAM-POWER FOR FARMERS.

THE EXTENDED APPLICATION OF THE STEAM-ENGINE, OR OTHER IMPELLING POWER OF THE THRESHING-MACHINE, TO FARM PURPOSES:

BEING EXTRACTS FROM AN ESSAY ON THIS SUBJECT,* BY ROBT. RITCHIE, F. R. S. S. A. &C. Civil Engineer, Edinburgh.....Premium, Ten Sovereigns.

THE rapid advancement which Great Britain has made by the influence of her steam-power and machinery in manufactures, commerce, and navigation, has not been without a corresponding effect, though perhaps not to the same extent, in Agriculture. The proof of this is visible in the strenuous exertions made by agriculturists, of late years, to avail themselves of the use of machinery and improved implements of husbandry to economize labor. With the power of the steam-engine at command—although not now, perhaps, to the extent it may ultimately be made available—the British farmer has it in his power, at a moderate expense, on almost every farm, to lessen the labor of the barn, to extend its application to various useful purposes, and to place farm economics in a position of advancement which they have not hitherto attained. . .

By far the greater portion of the threshing-mills erected in the agricultural districts of Scotland are propelled by horse-power; but however convenient the use of the horse-walk and fixed threshing-machine was to the farmer, and justly considered, when introduced, as a great improvement in barn operations, and is yet esteemed so, still it has not been without its inconveniences; but when contrasted with the laborious employment of the flail, yet so generally in use throughout the world, its greater expedition and efficiency become apparent; and, when we consider that the use of the flail was better than the feet of animals, we may be enabled to form some idea of the value of the horse-mill to farm purposes. Still, of later years, the intelligent farmer has hailed, with much satisfaction, the application of a new impelling power to the threshing-machine—a power whose dominion extends over every branch of the arts and manufactures of our country—which has given an impulse to modern nations, a command over the produce of every climate, and of which the most learned nations of antiquity never could surmise.

The application of steam-power to farm purposes seems by far the most important improvement which has been made, connected with Agriculture, in these times, and must, from its obvious advantages, soon supersede every other power, except, perhaps, in a few isolated situations, where an ample water-power can be obtained, or where the smallness of the farms make it unimportant.

It is a good many years since steam-power was first applied to farms in Scotland, and, in the borders of England, in some few instances, from twenty to perhaps thirty years; but it is only within the last ten or fifteen years that it has become general, if it can even be said to be yet in general use.

The advantages of the steam-engine over wind, as the impelling power to the threshing-machine, appear to be, that it is always at command, and ready to perform the work required by day or night. Its advantages over water-power are, that neither heat can dry it up nor cold freeze it. Its advantages over horse-power are, that the motion is more regular and the work must be better done; for horses, in the threshing-mill, generally pull unequally, while the strain upon the limbs, in this severe work, proves injurious to them. When the farmer, too, has always his horses fresh and ready for the field, he can do more work with fewer horses;* and if a pair or more can be saved, it is an important item to him.

One manifest advantage of steam, as the first mover of machinery, arises from its rapidity and certainty. If the farmer, therefore, can bring his grain on the shortest notice into market—if he can either thresh one stack or a dozen without stoppage, and so avail himself of any sudden rise in the market, without delaying or retarding the other operations of the farm—he possesses advantages invaluable, though no other were attained—advantages which no other means of threshing can give him. But steam-power likewise possesses that steadiness of action which cannot be obtained while employing the horse, and a much greater quantity of corn can be threshed in a day. The usual quantity of corn threshed by a six-horse steam-power, is at the rate of five quarters per hour, but four quarters may be taken as the general quantity to thresh easily; however, the quantity must vary according to the grain and straw. If the average of horse-power, as generally driven, be taken at thirty quarters per diem, the average of steam-power may be taken at fifty quarters, giving an advantage of twenty quarters in favor of steam-power, while the latter is kept up at no other expense, save fuel of the cheapest description—culm or dross is generally used—and, unlike the horse, when not working, *costs nothing!* hence, in every point of view, the use of steam-power on farms must prove advantageous.

The author of the excellent Treatise on Agriculture in the last edition of the *Encyclopædia Britannica*, seems to have fallen into an error when he says, "Wind and steam-power require too much expense for most farms, and that the use of steam must be confined for the most part to coal districts." From the recent

* The author, by permission of the Directors of the Society, intends shortly to publish this Essay entire, with drawings fully explanatory of the different kinds of engines used on farms, mode of attachment to old mills, and connected with subordinate machines; with a historical sketch.

* The saving of a pair of horses to the farmer has been estimated at fully £100 per annum. Some farmers tell me, who have steam-power, that they can save a pair of horses out of four, on large farms.

date this article has been published, this opinion might not have been expected, if referring to the agricultural districts of Scotland. It may be presumed, therefore, the opinion has been inadvertently given, and if the author had entered more fully into the consideration of steam as a motive power, he would certainly not have classed it with wind-power. Indeed the rapid extension of steam-power to farms speaks volumes in its behalf. He would have found on investigation the immense benefit of the application of the steam-engine at a *very moderate expense to the farm*. A power which only requires to be understood to be more appreciated, and what almost every farmer who has used it has found to be one of the most advantageous improvements he has made on his farm-stead; and, while it increased his comfort, it was attended with no difficulty in the management, requiring no other attention than what any farm servant could easily give.

This power indeed, as applied to Agriculture, is yet in infancy; but with a prospect of gigantic manhood before it, it seems fitted in all probability, as it becomes more extended in its range of application, to change the entire face of the country, and give the same impetus to Agriculture, which it has done to all branches of the Arts. No well-informed farmer should be insensible to the value and utility of the steam-engine, even limited as it now is as a moving power to the threshing-machine, and the adoption of this power by him, in most instances, in the best agricultural districts of Scotland and borders of England, evince beyond a doubt, that it, in his opinion, is the best and most advantageous power which has been yet applied, wherever there are not insuperable obstacles intervening; and it shows how readily the enterprising farmer avails himself of whatever improvement enables him to support competition and improve the capabilities of his farm.

In England, *fixed* threshing-machines have not been much used for farm-steads, hence stationary steam-power mills are rarely to be met with. This may arise from a variety of causes without the value of these being overlooked by the various public-spirited agricultural associations scattered over the south. It cannot, however, be supposed, as its advantages become better known and understood, that the application of steam-power to farms, both in England and Ireland, will not in time become as common as in Scotland, where it has extended with amazing rapidity.* The threshing of grain with machines in England is generally carried on with portable mills wrought by horses; the threshing of grain being in some counties a regular branch of trade, the thresher removing his machine from farm to farm. Recently, steam-power has been strongly recommended at agricultural meetings (at the late show at Derby and other parts) for this purpose, and is now getting into use. The Disc Engine Company of Birmingham have invented a very compact portable engine, boiler, and threshing-machine, on a carriage. The whole machine provides for its being readily moved to different farms. Mr. A. Deans of Birmingham has also made, for a similar purpose, several forms of portable cylinder and piston engines, some with upright and some with horizontal cylinders. These engines are of different powers, from four to six horses', and the engine is placed on a neat iron carriage.—The whole occupying very little room, requiring no chimney-stalk or brickwork, and is drawn from place to place by one or two horses. It may be worked, he states, in the field or anywhere, without any fixing, for threshing corn, cutting chaff, and other agricultural purposes.—Mr. Deans' inventions are clever, and many of them will be found useful. His portable steam-engine, with patent irrigator and fire-engine combined, adapted at the same time for driving threshing-machines, pumping and draining, is deserving of the attention of the farmer. These applications are all very suitable for small farms, and dispense with the laborious employment of the flail. But the advantages of a fixed threshing-machine, and steady and cheap motive power, under the command of the farmer at all times, are so palpably apparent, that the only wonder can be how the farmer of land, to any reasonable extent, can do without it, as the want of it must place him under many disadvantages.

In the following remarks, respecting the subordinate purposes to which the prime or impelling power can be advantageously extended at the farm, the observations shall be confined to steam-power, although it will be easily understood that many additional uses to which this power can be applied may equally well suit any impelling agent of machinery in which there is a surplus power.

Before entering on this subject, it may be proper shortly to describe the form generally adopted, and give an example.†

In most of the new onsteads, where steam-power is used, the engine-house is generally an outshot from the barn. The boiler of the steam-engine is supplied from a well sunk at one side of the engine-room. This is the general plan with stationary farm-engines, and the back or surplus water from the boiler is returned to the well, the water being usually moderately heated before entering the boiler. But when well water cannot be obtained, which often happens in coal districts, a pipe is led to a cistern, from the nearest pond, from which the engine pumps the water directly into the boiler; or the engine may be made to pump the water from the pond at a moderate distance; but this is just taking so much power from the engine itself. It is desirable always that the pump throws up an ample supply of water, when high-pressure engines are used, to prevent, from negligence, the risk of overheating and burning the sides of the boiler; of course, with condensing engines, a much more abundant supply of water is indispensably necessary: hence the non-condensing engine has been in many cases adopted, from the smaller quantity of water it requires. The engine, about seven horse-power, is on the non-condensing principle, with over-head crank; and the attachment of the power to the mill is extremely simple. The threshing-mill itself possesses every modern improvement. There are elevators to lift the grain to the hand-fanners, and elevators to repass the refuse through the mill; both of which are likewise worked by the engine-power; likewise a corn and bean bruiser, which admits of being attached or detached at pleasure. The steam-engine has been several years in use,

* The Report on the Advantages of Steam as a Motive Power on Roads, by the House of Commons, is strangely coincident in the same reasoning.

† In the following remarks it is barely possible to be intelligible without sketches of the drawings which accompanied this Essay, except by those who are conversant with Scotch farm-steads; but as the paper and drawings will be subsequently published, reference can be made to the book.

and is most perfect of its kind, (it was made under my own direction,) and is capable of driving easily the threshing-machine and machinery connected with it, and also any additional machines which the farmer may find for his advantage to attach to it.

Another example is given, showing the connection of the steam-engine with a very complete set of farm-offices. This is entirely new, and would easily admit of subordinate machinery, if desired. This steam-engine is also of high-pressure or non-condensing, excellent of its class, and capable as it ought to be, of doing more than the work required of it. The neatest arrangement, however, of the steam-engine house and boiler, is when these buildings form a part of the range itself of the farm-buildings, and not an outshot from it.

But, in truth, there is no end to the different plans which could be adopted by a skillful farm-architect or farm-engineer; and it may be said every farm-stead requires a separate design to suit the locality and wants of the farmer. There are no parts of Scotland where so many snug, compact farm-buildings can be seen as in the neighborhood of Edinburgh, the accommodation is ample, without being superfluous. So rapid, indeed, has been the extension of steam-power to farms in this vicinity, that from the fine elevations round Edinburgh, more than 100 steam-engine stalks or chimneys may be observed as the landmarks of the farm, and giving a peculiar feature to the landscape.

Although the subordinate purposes to which the impelling powers of the threshing-machine have as yet been extremely limited, yet it admits of no doubt, if under proper control, it may be applied to a variety of useful purposes to which it has not as yet been applied, beside that of threshing grain. It is, therefore, of importance to consider the most simple and economical way in which the subordinate machines can be connected with the impelling power.

To the bruising of grain the power is commonly applied, and that most advantageously to the farmer. It has also been applied to chopping of hay, slicing of turnips, grinding of rape-cake, working a butter-churn, and driving circular saws; to these, and perhaps many other purposes, the first power has already been at different farms applied. An inconvenience however, arises—although, perhaps, of no very great importance—when the smaller machines are used, that they cannot be driven except when the threshing-mill shaft is set in motion, as the axle or shaft of the steam-engine connects the first power with the mill, and, if worked with belts, from a separate shaft; this latter shaft cannot be set in motion until the main engine-shaft, which connects engine and threshing-machine, is going. When subordinate machines are used, worked by steam-power, they should be so contrived that the mill* may either be worked at the same time, or taken out of gear, and the machines worked or driven independently of the mill. This may be attended, perhaps, with more expense in the first erection, but it is more complete, and will, on most occasions when used, save a loss of much steam.

Several examples might be adduced in explication of these points. At one of the first steam-powers, for a large farm, put up in West Lothian, the steam-engine can either drive the threshing-mill in conjunction with grinding-mills for meal and flour, or the latter can be used by themselves. The machinery can be detached or taken out of gear at pleasure, and the whole is of the most perfect description. In such a case as this, the steam-power must be ample, which it is in the instance alluded to.

In another example of a simple description, in Mid-Lothian, an engine of eight-horse power, non-condensing, is regularly in use for a saw-mill, while, at the same time, it is the motive-power of the threshing-machine. The force is communicated to the saw-mill by means of a large cogged wheel placed on the main shaft, between the fly-wheel and engine itself, driving two circular saws. The power is taken from, or given to, either threshing-machine or saw-mill at pleasure, by means of pinions or small wheels. Cut wood is manufactured here to a considerable extent, which shows how easily the steam-power can be advantageously employed, and to do also the work of the threshing-machine.

It would be tedious to go over the various skillful applications which have already been made use of by enterprising farmers in the agricultural counties round Edinburgh. The subject is *new*, and, perhaps, but in infancy. Of course a great deal remains to be done by skill and ingenuity before such plans are extensively adopted; but I have little doubt as the value of steam, as before stated, becomes fully known, as the *best* PROPELLING POWER FOR THE FARMER, endless may be the applications of it even to farm purposes.

One of the best examples I have yet met with of the acknowledged utility of subordinate machines worked or driven by the first power, is at a fine farm in East Lothian. The steam-engine which drives the threshing-machine is a neat condensing-engine, but only of six-horse power. In addition to working elevators and dressing fanners connected with a complete threshing-machine, a shaft or axle—taking the power directly from the main-shaft of the mill—is led through the barn, which, by means of drums and belts, is made to work a corn-bruiser, barley-hummeler, and fanners, and likewise a pair of stones for a flour-mill, and a mill for grinding rape-cake; and, by an additional shaft, a circular saw. The whole of the machines are so arranged that they can be driven alternately, and the flour stones are let off to a neighboring miller, thus proving the economy of the arrangement. In addition to these machines, the spare steam from the boiler is made to heat a *drying-loft*, which is placed over the boiler-shed, on the floor of which small tin or iron pipes are laid, heated by steam from the boiler. These pipes are protected by a grating of wood, and the whole covered with hair-cloth. Damp grain is here dried with the greatest facility; and in wet seasons the drying-closet or room is found to be of great utility.

Indeed, the whole arrangement at the farm displays much skill and ingenuity; and we could not have a better example of a *small power* with which so many subordinate machines can be usefully employed without great trouble or expense.

I might give several more illustrations from *other farms* where great ingenuity has been displayed in economizing labor by machinery; but I think it unnecessary, as the one I have given is among the best instances I have met with where the advantages of such means were

* The word mill is used indiscriminately for threshing-machine.

duly appreciated and early adopted. However, it may be said that, in general, the impelling power is *strictly confined* to driving the threshing-machine and connections of it. Indeed, unless the steam-engine has ample power, it would be useless attempting to work more than the mill at one time; but we see, if the power is judiciously arranged, that even a steam-engine of *only* six-horse power can be made of powerful avail to the farmer.

It seems singular that the farmer of the present day does not turn more attention to these useful applications of ingenuity so advantageous to himself, of which I have given so striking an example; for, when we turn to the century that is past, which we are so apt to deride for its want of mechanical contrivances, and think so much behind the present age, we shall find much to admire if we have the patience to investigate. If we turn to the works of Dr. Stephen Hales, F. R. S., and other writers, farmers will find much curious and useful information. His plan of keeping corn sweet in sacks was considered of great benefit to farmers. A hollow reed or cane, perforated with 200 holes, was placed in the sack, and the nose of a common kitchen bellows placed into a wooden faucet attached to a leathern pipe ten inches long, distended by a spiral wire fixed to the top of the stick. Each stroke of the bellows would discharge a quart of air, sixty-four strokes per minute would convey a quantity of air equal to the capacity of a four-bushel sack. With the steam-power at command at the farm to drive a blowing-fan, such a scheme as this could be easily adopted by the farmer, and still exceed the plan of preserving corn by ventilation, which was much thought of at the time, although ventilators of a much simpler construction can now be readily applied for the purpose. It is stated (in the *Gentlemen's Magazine*, 1749) that the ventilators contrived by Dr. Hales for preserving corn were so much esteemed in France that M. de Humel de Monceau, a Member of the Royal Academy of Sciences, preserved a large heap of corn free from weevils for two years, without turning it, merely by *blowing air up through it*. He likewise procured a large granary to preserve, in the same manner, with ventilators worked by a wind-mill, quantities of corn, with a view of making it a general practice in France. Dr. Hales also applied his ventilators very usefully for sweetening milk when ill-tasted, also for water, by blowing showers of air through it. His ventilators in dairies would be found advantageous. If such was the knowledge of these matters in the last century, it seems singular how little has been really done to follow out the experience they acquired; yet it is not the less curious to observe the coincidence that so often happens between past and present inventions; for the plan I have described, as applied for drying grain in East Lothian, is a counterpart of the very plan recommended by Dr. Hales for drying malt, hops, &c. only the latter had the advantage in recommending blowing fresh air upward through wooden bars, "*or large laths, nailed to the floor, and hair-cloth to be laid on them.*"

While, therefore, improving the present inventions, do not let us overlook the past, and claim, as new ideas and inventions, what may have been known and applied centuries before. Let the information and appliances of the past be acknowledged as so much experience gained, and incorporated with the superior advantages in mechanical construction of the present times.

In applying the steam-engine power to subordinate purposes, and mixed machinery at new farm offices, there is more scope for the exercise of skill and judicious arrangement on the part of the farm-architect and engineer than when steam is made use of at old farm buildings. The method of connecting the first power to the machines, likewise admits of difference of opinion. It is sometimes done by belts and sometimes by cogged and beveled wheels. Although there is more friction by wheels, they are generally preferred by engineers, as belts are apt to slip, and cannot be durable, instances being found where in places in barns, or places infested with rats, they are even destroyed by these vermin. All main shafts or axles are invariably preferred to be connected with wheels, and likewise in connecting subsidiary or minor shafts to the first mover, wheels are made use of, although, in many instances, belts must be had recourse to, and, by having several shafts to lock and unlock to the main crank shaft, or to go easily in or out of gear, a variety of useful machines may be driven by steam-power at every farm at which steam is made use of.

At new farm buildings, in addition to driving the threshing-machine, the whole array of the minor implements or machines of the barn, and machines for preparing food for cattle and horses, machines for working the dairy utensils, machines for preparing artificial manures, machines for pumping or irrigation, by means of hose, machines for preparing grain for food, and machines for giving warmth and ventilation, might all be attainable, and easily made applicable at every farm, by means of steam-power.

Although such machinery may at first view appear *complicated*, yet in *reality* it *is not so*, and might be made of very easy management. I need not enter into any minute description of the methods of applying such subordinate machines as may be thus adopted. The details must be left to individual skill to execute. It is sufficient here that I suggest and point out the practicability of easily following out the suggestions made. With this view, the germ of such an arrangement of subordinate machines, applicable to the various purposes above noticed, I shall briefly describe.

A steam-engine of ample power (suppose six, or eight, or ten-horse power, for farms varying from 250 acres and upward) is erected, in the first instance, to drive the threshing-machine, and is supposed to be in daily use, as the *extended* application of steam-power *implies that the* farmer will find it to his advantage to make use of the engine almost constantly, or, at all events, in winter, to have the fire on the boiler. To be of real utility, the power must be generally available or at command, at least more frequently in use than *presently* done, where the engine and boiler remain a dead letter except when threshing is going forward; and where the refuse of coal or culm can be readily obtained, as in coal districts, there can be little apology wanted for not having the boiler regularly in use, which should be constructed on the most economical principles as regards fuel. The construction of the boiler is of most paramount importance in farm-engines, both as regards economy and safety. We have seen what has been done in locomotive engines, by industry and economy in fuel, shown fully in Mr. Macneil's evidence before the House of Commons in 1832. The evidence of Mr. Macneil in con-

vincing the Committee that experience will soon teach a better construction of the engines, and a less costly make, and generally a requisite supply of steam. When the steam-engine was not required for the purposes of the barn, it might, perhaps, in many farms, be advantageously employed for the purposes of pumping and irrigation. Supposing the engine, therefore, to be nearly in daily use, and having every modern improvement, and the threshing-machine of similarly improved construction, with elevators, hummeler, corn and bean bruiser, &c. &c. By a direct shaft from the steam-engine, with the power of attaching or detaching, taking in or out of gear at pleasure, meal or flour mill stones are applied, these, if inconvenient, to be worked by the farmer, or, if the corn-mill divides his attention too much, I have given an example where the spare power of the engine was let off to a neighboring miller. In several instances, however, I have met with farmers who advantageously made use of flour, barley, or meal mills at their farms, and if not used for grinding, a pair of stones would be found of great advantage for bruising grain, and several have been applied for this purpose in the south of Scotland and in Northumberland, at large farms, as much more powerful than the common corn-bruising rollers. From the same shaft a rape-mill, an oil-cake crusher, or even a malt roller, could be easily applied, and a circular saw be driven, and, if thought requisite, a bone-mill could likewise be wrought by the same shaft, and in many farms found useful for "converting ashes, and a variety of otherwise useless rubbish, into fertilizers." Another shaft passing through the straw barn could easily work a straw and hay cutting machine, and also a turnip and potato slicer. The former could be conveniently placed in the stable court (at no great expense a hayloft might be made above the straw barn) and the latter could be placed very conveniently near the cattle court, at the turnip court, or, if preferred, the straw-cutter could be advantageously placed there, instead of the turnip slicer, as these are found so useful in the field.

Other minor machines could easily be driven from these two shafts as they pass through the respective barns—such as a butter churn for dairy purposes. I have not dwelt much on machinery for dairy purposes, because dairy farms, on a large scale, are rarely combined with grain farms. However, as every farmer is more or less connected with feeding cattle and making butter and cheese, it must be obvious that the command of steam-power gives many advantages, and points out how the female department of the household can be saved much useless labor, and their attention turned to more profitable purposes. Thus the labor of churning by the churning-machine worked by steam-power will enable a great deal more work to be done in much less time.

In addition to the machines I have noticed at the general farm, I may mention that a very simple contrivance might construct a *tram*-way and wagon to the threshing loft, by which the engine could be made to *draw up* the grain to supply the threshing-mill, and *return down* the empty wagon, saving much manual labor. Elevators for grain could also easily be constructed to *lift up the grain* to the granary, and lower it upon the carts, wrought by the steam-engine.

The above are a few out of many practicable purposes to which mechanical science may be made to economize human labor, and render the exertions of the *farmer* more advantageous to himself. But a new element is mixed up with the applications of the steam-engine to farms, which, in another point of view, gives it still greater advantages, and these of a practical kind. I allude to the use *which can be made* of the *steam itself*.

A steaming apparatus is a necessary appendage to every farm of a moderate size, and its utility is very generally appreciated. The steam is commonly raised by a separate boiler, but very little skill would be required in applying the steam from the engine boiler to a complete steaming apparatus for cattle. The objections of the steam not being in constant use I have already alluded to. Where, indeed, the farmer is *resolved* merely to confine his steam-engine to threshing of grain, of course a portable steam-power would not apply—it would be inexpedient, perhaps, to draw steam from his engine boiler, or even put water for boiling turnips in wintering cattle. But the time will soon be past when the farmer will cease to be told, "What a pity it is you cannot make use of your steam-power, except merely for threshing, after going to so much expense for its erection—it is thus useless to you (keeping it idle) two-thirds of the year." As I have said, a test for the ingenuity of the farmer is to be shown, and he will be judged of as the cleverest and most practical farmer whose skill has brought out the most numerous and useful applications. Hence, in this light, steam-power is to be judged of not merely as a *motive power*—which water can as cheaply perform, or which, some day, electro-magnetism* may, perhaps, as cheaply effect—but as possessing advantages *per se*, which I shall attempt shortly to point out. The boiler of the engine, which ought to be no longer than really required to give *steam enough* to prevent waste of fuel in winter, must be daily regularly heated, and then either steam from it, or hot water, as may be required, is to be obtained for preparing food for cattle. It is likewise to be made equally available for stable use. The advantages of having hot water *at all times* in stables is appreciated by every gentleman who takes an interest in his stud.† The spare steam can be made easily to heat a complete range of cottages for farm servants, which may be situated in connection with the farm offices as not to be inconvenient.

We have already seen the facility by which the spare steam was made use of, at a very small expense, to heat a drying loft; even the heat of the boiler itself might be of utility for damp grain placed above the boiler shed, as is frequently done for drying-houses of manufacto-

* Although there is little prospect at present of electro-magnetism being brought into use in this country as a moving power of machinery, yet it is stated it has already been brought to considerable advancement on the Continent—and the very ingenious applications of this powerful agent by Mr. Daniels, and others, holds out a decided prospect of its more extended applications. A very clever model of a machine, driven by electro-magnetism, was shown at one of the Highland and Agricultural Society's monthly meetings, by Dr. Aiton of Dolphington, and an interesting account read by him of the application of electro-magnetism to machinery.

† In some stables the whole range of sleeping-lofts or apartments for the grooms were heated, under my directions, by hot-water pipes or steam; likewise water tanks, or cisterns for the stalls, were heated by hot pipes passing through them.

ries. The utility of this plan must not be overlooked in making arrangements for using steam-heat, nor likewise the simplicity by which the same agent could be applied for a clothes-drying house for family use. Nor must we forget the advantages of heating poultry-houses with spare steam-heat, or even the poussiniere, or nursery for egg-hatching. Nor is this chimerical—the poussiniere of M. Bonnemain, invented fifty years ago, heated by hot-water pipes, or steam, we are told, was found to be an ingenious and profitable establishment; and this plan, as old as the Egyptians, while it has been revived within these few years, affords to the busy housewife, where her spouse has laid out a few pounds on the erection of a steam-engine, or steam-mill as it is called, or boiler, an ample supply of heat for bringing chickens in winter into market, to reward her with a profitable investment. The above are merely a few things of the many this powerful agent can be made to do, even on a small scale; nor must I forget, for the housewife, the washing-machine, both *driven* by steam-power, and *supplied* with steam, and other excellent applications of steam, many of which will be found described (as they have been practically applied) in Silvester's Domestic Philosophy.

The great distance to which steam can be conveyed from the boiler would excite surprise to those who have never seen it; hence there could be no difficulty in applying it, in addition to what is stated, to many horticultural purposes—such as warming a hot-house and conservatory, and pine or melon pits, or even forcing land, or garden ground. The daily new inventions and purposes to which it is applied point out an inexhaustible field for extension.

But the utility of the steam-engine is not practically exhausted: the boiler chimney could be made of the greatest utility for an important purpose—*ventilation*—a thing so much neglected in most arrangements. The whole range of stables, cattle-sheds, and even piggery, grain lofts, &c. could be brought under a perfect system of ventilation by the fire draught, by means of metal or wooden pipes, or brick or stone flues, communicating with the ash-pit of the furnace—a plan which has been long known,* yet so little practically made available. The importance of ventilation to stables, though generally admitted, is frequently neglected. Although we have many examples on record, especially in horse-barracks in the army, of the evil consequences of bad ventilation—as all animals, when confined, rapidly destroy the atmosphere, both by respiration and secretitious exhalations from the skin—producing carbonic acid, and other ammoniacal and mephitic gases. Hence the lower animals require *even more air* in the same ratio than the human race; and, to keep horses, cattle, poultry, sheep, pigs and dogs in a healthy condition, and free from cutaneous diseases, when much confined, besides wholesome food, a constant renovation of the air should go on; and even in stables, if heat is required, which it must be, it is surely better to provide artificial heat, by passing a steam-pipe through the stable, than by enclosing the animals in a loose box heated by their own exhalations, or by closing the stable up, to allow them, as it is termed, to draw heat from one another. I do not think sufficient attention is ever paid, in the construction of stables and cattle-houses, to the necessity of ample *light* as well as *air*. The effect of want of light on vegetables and plants is so well known that there can be no doubt light is equally required for the health of man and the lower animals. In addition to the stables, &c. the same range of cottages which I have shown could be so easily heated with spare steam, or hot water, from the engine-boiler—could, with equal effect, be ventilated by flues drawing or sucking out the impure air to the furnace—or if the fire draught was found inconvenient, or thought objectionable, as has been said, for "attenuating the air," then the wind fan could be driven by the steam-engine, to effect the same purpose. In all and every case to which ventilation is applied, whether to suck out the impure air from cottage or stable, provision is to be made for the inlet of fresh air, as well as the escape of impure air. Thus, with a little expense in the first arrangement, farm-house, cottages and offices could be placed under a thorough system of ventilation—under perfect control; and the same agent which effected this would supply, without more cost for fuel, an ample supply of heat to warm with salubrity many cottages; even ample supplies of warm air, if preferred, heated by steam, might be distributed, thereby increasing the comfort of the cottage fire or the farmer's hall.

In addition to all this, an agent so accessible as the engine chimney might be applied to other useful purposes—to preserve the roof and timbers of the buildings, as well as so contrived that a flue from each stack in the yard might create a circulation of air in wet weather, and prevent the heating of the grain in the stack.

I might pursue this subject still farther, but I am well aware that even much of what I have already suggested the farmer may be apt to regard as chimerical, and inconvenient for him to adopt in practice. This I am prepared to expect. But opposition of this kind goes for nothing. It is like the slow-sailing ship in the wide sea, which is soon distanced by more active competitors. When we remember the state of the Scottish farms of old, and contrast them with the improved state of modern tillage, and knowledge of chemical properties of soils and manures, we may observe what a few years have already produced, and what a prospect of progressive advancement is still held out. I agree with Mr. Babbage "that Science and Knowledge are subject, in extension and increase, to have effects quite opposite to those which regulate the material world: the farther we advance from the origin of our knowledge, the larger it becomes, and the greater power it bestows upon its cultivators to add new fields to its dominions. . . . The mind contemplates the past, and feels irresistibly convinced that the whole already gained bears a constantly diminishing ratio to that which is contained within the still more rapidly expanding horizon of our knowledge. . . . The experience of the past has stamped with the indelible character of truth the maxim that '*knowledge is power.*'"

[Journal of High. and Ag. Soc. of Scotland.

BURNT CREAM.—*Prep.* Cream, 1 quart; cassia, a small stick; the peel of half a lemon; boil for 5 minutes; let it cool a little and take out the spice; then add the yelks of 9 eggs, and sugar to sweeten; stir until cold, put it into a dish, strew powdered sugar over it, and bake it until brown.

* See an account of this, in a paper read by the writer before the Royal Society of Arts, 10th April, 1843; and printed in the Society's Transactions.

REARING CATTLE.

THE REARING OF CATTLE, WITH A VIEW TO EARLY MATURITY, AS PRACTICED IN BERWICKSHIRE, ENGLAND.

BY MR. JOHN WILSON, EDINGTON MAINS, BERWICKSHIRE.

THE valley of the Tweed has long been famed for the rearing and fattening of cattle, its rich pastures, warm turnip-soils, and proximity to England, affording peculiar facilities for prosecuting this branch of rural economy. The "Short-Horns" were early introduced into it, and soon became its established breed; and, though still inferior to the Tyneside herds in symmetry, color, and grazing quality, yet nowhere, perhaps, are they brought to market, at two years old, in such perfection of weight and fatness.

The production of beef, at the quickest and cheapest rate, being the object in view, the first requisite is a stock of cows possessing qualities suitable for this purpose. Accordingly, they should be good milkers—able to keep at the rate of two and a half to three calves each—of a kind known to have a tendency to fatten readily, and to come early to maturity, and of a structure likely to produce a vigorous, well-grown steer. In other words, they must be good Short-Horns; only having more regard to their milking properties than is usually done by breeders of bulls. And here it may be well to notice, that it is in general highly inexpedient for the beef-grower; the farmer who depends largely on his regular cast of fat cattle—to attempt breeding his own bull. *It is only a few individuals in any district who have the taste and skill requisite for this difficult department of the business, not to mention the large capital which must necessarily be invested in it, the precariousness of the return, the greater liability to casualties of such high-bred animals, and the additional expense of their housing and maintenance.* On Tweed-side, the breeding of bulls is confined to a very limited number of persons, chiefly Northumbrians, who, by devoting their whole attention to this department, are able, from year to year, to furnish a class of bulls which are steadily improving the general breed of the district. The contrary practice is at this moment compromising the character of this valuable breed of cattle in several districts of Scotland into which they have been more recently introduced. *Made wiser on this point by experience, the farmer of the Border purchases from some breeder of established reputation a good yearling bull, which he uses for two or three seasons, and then replaces by another in like manner.* This bull serves his own cows and those of his kinds, and some of the neighboring villagers', and thus, though his own stud be limited to six or eight cows, he can select from the progeny of his own bull as many calves as he requires to made up his lot, and has them more uniform in color and quality than could otherwise be the case. As the male parent, among sheep and cattle, is known to exert by far the greatest influence in giving character to the progeny, and increasingly so in proportion to the purity of his breeding, it is evidently much for the advantage of the beef-grower to *spare no reasonable trouble and expense in obtaining a bull of thorough purity, and then to select his calves with the most scrupulous attention.* From overlooking all this, how often may cattle be seen, on the best of land, too, which can only be fattened at an enormous expense of food and time, and after all, are so coarse in quality as to realize an inferior price per stone. Occasionally a few beasts of the right sort will seen in such lots, which, by going ahead of their fellows, to the extent of £4 or £5 a-piece of actual market value, show what might have been done by greater skill or attention on the part of the owner.

It is very desirable to have all the cows to calve betwixt the 1st February and 1st April. If earlier, they will get almost dry ere the grass comes, and calves later than this will scarcely be fit for sale with the rest of the lot. When a calf is dropped, it is immediately removed from its dam, rubbed dry, with a coarse cloth or wisp of straw, (this being what the cow would do for it with her tongue, if allowed,) and then placed in a crib in the calf-house among dry straw, when it receives a portion of its *own mother's* first milk, which, being of a purgative quality, is just what is needed by the young animal. For a fortnight, new milk is the only food suitable for it, and of this it should receive a liberal allowance thrice a-day; but means should now be used to train it to eat linseed-cake and sliced Swedish turnip; and the readiest way of doing so is to put a bit of cake into its mouth immediately after getting its milk, as it will then suck greedily at anything it can get hold of. By repeating this a few times, and placing a few pieces in its trough, it will usually take to this food freely, and, whenever this is the case, it should have as much as it can eat, that its allowance of milk may be diminished, to meet the necessities of the younger calves which are coming in succession. This is of the greater importance that it is always most desirable to avoid mixing anything with their milk by way of helping the quantity. When a substitute must be resorted to, oatmeal porridge mixed with the new milk is perhaps the best. Sago of late years has been much used for this purpose; but an eminent English veterinary surgeon has recently expressed a very decided opinion that its use impairs the digestive powers of the animal and predisposes to disease. The sour smell invariably found in a calf-house, where porridge or jelly of any kind is mixed with the milk, is proof sufficient that indigestion is the consequence. An egg put into each calf's allowance, and mixed with the milk by stirring with the hand, is a good help, and never does harm; but, with this exception, it is best to give the milk warm and unadulterated, however small the quantity, and, along with this, *dry* farinaceous food, turnips and hay, *ad libitum*. If more liquid is needed, a pail with water may be put within their reach, as this does not produce the bad effects of mixed milk. Indeed,

in this, it is the best to keep as closely as possible to the natural arrangement according to which the calf takes its suck—at first frequently, and then at longer intervals, as it becomes able to eat of the same food as its dam.

The diet of the cows at this season is a matter of some consequence. Swedish turnips yield the richest milk, but it is too scanty, and calves fed on it are liable to inflammatory attacks. Globe turnips should, therefore, form their principal food during the spring months. Care must also be taken that they do not get too low in condition in the autumn and winter, and for this end it is well to put them dry *at least* three months before calving. Some may think this long; but, but, on a breeding farm, milk is of little value this season. The cows, when dry, are kept at less expense, and, by this period of rest, their constitution is invigorated, greater justice done to the fœtus, now rapidly advancing to maturity, and so much more milk obtained after calving, when it is really valuable.

When the calves are from four to six weeks old, they are removed from their separate cribs to a house where several can be accommodated together, and have room to frisk about. So soon as the feeding-yards are cleared of the fat cattle, the calves are put into the most sheltered one, where they have still more room, and are gradually prepared for being turned to grass; and, when this is done, they are still brought in at night for some time. At six weeks old, the mid-day allowance of milk is discontinued, and at about fourteen weeks they are weaned altogether. When this is done, their allowance of linseed-cake is increased; and, as they have been trained to its use, they readily eat enough to improve in condition at this crisis, instead of having their growth checked, and acquiring the large belly and unthrifty appearance which used to be considered an unavoidable consequence of weaning.* The cake is continued until they have so evidently taken with the grass as to be able to dispense with it. They are not allowed to lie out very late in autumn, but, as the nights begin to lengthen and get chilly, are brought in during the night, and receive a foddering of tares or clover foggage. When put on turnips, the daily allowance of cake, say 1 lb. each) is resumed, and continued steadily through the winter and spring, until they are again turned to grass.—This not merely promotes their growth and feeding, but (so far as the experience of five or six years can determine the point) seems a specific against black-leg, which was often so fatal as altogether to deter many farmers from breeding. It may be well to state here distinctly the particular purpose for which cake is given at the different stages of their growth. At first, the object is to accustom them to a wholesome and nutritious diet, which will supplement the milk obtained from any given number of cows, so as to admit of a greater number of calves being reared, and, at the same time, have greater justice done them than could otherwise be practicable. At weaning-time, again, it is given to help the young animal over the transition from milk to grass alone, without check to growth or loss of condition. During the following winter, however, the special object of its use is to prevent black-leg, as, but for this, turnips *ad libitum* would be sufficient.

When put to grass as year-olds, they decidedly thrive better on sown grass of the first year than on old pasture, differing in this respect from cattle whose growth is matured. They are laid on turnips again as early in the autumn as these are ready; and it is a good practice to sow a few acres of globes to be ready for this express purpose. It does well to give the turnips upon the grass for ten or fourteen days before putting them finally into the feeding-yards; and then, if they can be kept dry and warm, and receive daily as many good turnips as they can possibly eat (globe till Christmas and Swedish afterward,) they will grow at a rate which will afford their owner daily pleasure in watching their progress, and reach a weight by the 1st of May which, if markets are favorable, will reward him well for all his pains.

The leading features of this system are, *uniform good keeping* and *progressive improvement*; in other words, to get them fat as soon after birth as possible, and keep them so till they reach maturity. The details given above are a description of the expedients generally adopted by the breeders of this district for securing these objects. [Jour. of High. & Ag. Soc. of Scot.

* Corn meal would probably answer with us where the linseed-cake is not to be had. [*Ed. Farm. Lib.*

LIQUORICE.

To JOHN S. SKINNER, Esq.
Editor of the Farmers' Library:

IN the March Number of the FARMERS' LIBRARY, you state that there is "room for inquiry and need for information about Liquorice." It belongs to the natural order *Lequminosæ* of Botanists, or that tribe of plants which have blossoms and pods like the common pea. Its botanical name is *Liquoritia officinalis*. It is a deep-rooting perennial, and has long been much cultivated in Spain; and, according to Loudon, since Elizabeth's time has been grown in different parts of England; hence there is little doubt but that it would succeed well in this country.—Loudon says:

"The soil should be a deep sandy loam, trenched by the spade or plow, or with the aid of both. to two and a half or three feet in depth, and manured if necessary. The plants are procured from old plantations, and consist of the side-roots, which have eyes or buds. These may be taken off, either in autumn, when a crop of Liquorice is taken up for use, and laid in earth till spring, or taken from a growing plantation as wanted for planting. The planting season may be either October or February and March. In general the latter is preferred. The plants are dibbled in, in rows three feet apart, and from eighteen inches to two feet in a row, according to the richness of the soil. The after-culture consists in horse-hoeing and deep stirring, in weeding, and in cutting over and carrying away the haulm every autumn, after it is completely withered. As the plants do not rise more than a foot the first season, a crop of onions or beans is sometimes taken in the intervals. The plants must have three summers' growth, at the end of which the roots may be taken up by trenching over the ground. The roots are immediately sold to the brewers' druggists or to common druggists, or preserved, like carrots or potatoes, in sand till wanted for use. They are used in medicine and porter-brewing."

Yours truly, S. B. BUCKLEY.

Yates Co. N. Y. March 16, 1846.

SALT—A FERTILIZER.

BY C. N. BEMENT.

We take pleasure in transferring to the columns of the Farmers' Library, from the American Quarterly Journal of Agriculture, the following valuable article on the use of Salt as a Manure:

The value of salt for agricultural purposes has long been known, both in Europe and in this country; and why it has not been more generally used is beyond my comprehension. More than one hundred and fifty years ago, Sir Hugh Platt, an eminent writer of that day, speaks very decidedly of the benefits which might be derived from the practice of sprinkling salt upon land, and calls it the "*sweetest* and *cheapest*, and the most *philosophical* of all others." He relates the case of a man who, in passing over a creek on the sea-shore, suffered his sack of seed corn to fall into the water, and that it lay there until it was low tide, when, being unable to purchase more seed, he sowed that which had been in the salt water, and, when the harvest time arrived, he reaped a crop far superior to any in the neighborhood. The writer adds, however, that it was supposed the corn would not fructify in that manner unless it actually fell into the water by chance; and, therefore, neither this man nor any of his neighbors ever ventured to make any farther use of salt water.

The same curious writer tells also of a man who sowed a bushel of salt, long since, upon a small plot of barren ground, and that to that day (the time he was writing) it remained more fresh and green than any of the ground round about it.

Dr. Brownrig, who wrote more than a century ago, in speaking of salt says, "it is dispersed over all Nature; it is treasured up in the bowels of the earth; it impregnates the ocean; it descends in rains; it fertilizes the soil; it arises in vegetables; and from them is conveyed into animals."

In the neighborhood of the salt works in Great Britain, the value of salt as a manure is well known and acknowledged; "that when wheat and barley have followed turnips, on land which had been salted, the ensuing crop has invariably escaped mildew, although that disease had affected all the grain upon the lands adjacent, on which salt had not been used."

It has been asserted that salt is the mother of all manures, as every kind of manure is higher or lower in value according to the salt it produces; and every kind of manure is portioned out to the land according to the quantity of salt or nitre it is thought to contain.

"Nothing in Nature," said Hollingshead, "is so powerful as salt to meliorate strong and stiff soils, and also to give moisture to dry ground; it is also a certain destruction to weeds and insects. Besides its efficacy on corn and fallow-ground, its excellent qualities, in giving luxuriance and salubrity to grass lands, are peculiarly worthy the attention of the grazing and breeding of cattle."

"Soils," says an old writer, "which are subject to the grub, and must be fertilized by common dung, which is a proper nest for the mother-beetle to deposit its eggs, must be well impregnated with the brine of dissolved salt, after the dung is first cut up."

The efficacy of salt in destroying noxious weeds, grubs, and insects, is well known, in all parts, but a dose sufficient to kill weeds, would also destroy the cultivated crops; therefore, great attention and caution should be taken in not applying too much when intended to fertilize the soil.

As to the quantity of salt which it would be advisable to use per acre, for the respective crops and upon the different kinds of land, will be best learned by instituting a set of experiments upon every distinct species of grain and roots. Cold, wet land requiring more, and loose, light land, though it be poor, requiring less.—Four bushels to the acre, harrowed in after plowing, has been found a sufficient quantity on most soils, for corn and potatoes, but the best way of all others for ascertaining this point, would be for every one to depend upon the results of his own experiments.

To ascertain the exact quantity of salt which may be necessary for the different kinds of land, and to appreciate the benefits which result from its employment in all the various modes of culture adopted in this country, will require several long series of experiments; we would, therefore, suggest to the Executive Committee of our State Agricultural Society, that they offer rewards to such persons as shall give them an account of the best experiments with this mineral substance, in the different branches of farming and general Agriculture.

The safest way for a farmer to adopt, is to use his salt sparingly at first, and in all cases to leave a small portion of the same land without salt, so that the real effects produced by the salt may be, by comparison, in every instance, self-evident and palpable.

That salt is an excellent manure, experience, the most satisfactory of all evidences, clearly proves.

It is stated in an English publication, that "a farmer in the county of Sussex, some years since, had a field, one part of which was very wet and rushy, and that grass produced upon it was of so sour and unpleasant a kind that the cattle would not graze upon it; he tried several methods to improve it, but to little purpose; at last having heard of the benefits of salt as a manure, he determined to try that; for which purpose he procured a quantity of rock salt, which in a random way, without any regard to the precise quantity, he threw upon the rushy ground, fencing it off from the other part of the field, the effect of which was a total disappearance of every kind of vegetation. In a short time, however, it produced the largest quantity of mushrooms ever seen upon an equal space of ground in the country. These, in the spring following, were suc-

ceeded by the most plentiful and luxuriant crop of grass, far exceeding the other part of the field in richness of its verdure and the quickness of its growth; the cattle were remarkably fond of it, and though the salt was laid on it twenty years before, this part is still superior to the rest of the field."

An interesting detail, from Rev. E. Cartwright, will be found in the 4th volume of Communications to the Board of Agriculture (England), which is conclusive as to the application of salt as a manure for potatoes. It appears from this communication that the experiment could not have been tried on a soil better adapted to give impartial results. Of ten different manures which were resorted to, most of them of known and acknowledged efficacy, one only excepted, salt was superior to them all. Its effects, when combined with soot, were extraordinary, yielding in a row two hundred and forty potatoes, while one hundred and fifty only were produced from the row manured with lime. It was observable also, where salt was applied, whether by itself or in combination, the roots were free from that scrubbiness which often infects potatoes, and from which none of the other beds (and there were in the field near forty more than made part of the experiments), were altogether exempt. So much for foreign experiments; now let us see what has been done in this country.

From the information which I have been enabled to collect, I am inclined to believe that salt, when sparingly applied, is valuable as a fertilizer, and useful in destroying the grub and wire-worm, which often injure, and sometimes even destroy whole crops; and it has been found by experiments the past season, that the scab, or disease which has proved so disastrous to the potato crop in all sections of the country, has never been found upon land that had a proper dressing of salt.

Mr. Hamilton, of Schoharie, informed the writer that he had found great benefit from using salt on his potato ground last spring. After plowing, he caused four bushels of salt to be sown, broadcast, on the furrow, upon one acre of the field and harrowed in. Potatoes were then planted. Part of the field was not salted. Although the season was remarkably dry, the salted acre was observed to maintain a green, vigorous appearance, while the other part of the field looked sickly and stunted. On lifting them in the fall, those potatoes where salt had been applied were of good size, smooth skin, sound, and of good quality, and yielded a fair crop, while those on the unsalted part of the field, although the soil was fully equal to that of the salted portion, the yield was considerably less, potatoes small, and much eaten by worms.

His neighbor had a field of potatoes on the opposite side of the road, soil similar to his own, who planted them the usual way, and the consequence was, his crop was small, inferior in quality, and most of them rotted soon after digging—they were diseased.

Dr. Bogart, who has charge of the Sailor's Snug Harbor on Staten Island, informed the writer that he applied four bushels of packing salt to one acre of his potato ground, last spring, and thinks he derived great benefit from it. Though the crop was not a large one, the potatoes on the salted portion were of much greater size, skin smooth, and free from disease. The vines were more vigorous, remained green while those on land of the same quality adjoining, which was not salted, shriveled and dried prematurely; the tubers small and watery; produce less.

E. M. Stone, in a late number of the N. E. Farmer, says:—"Last spring I tried an experiment on potatoes. I planted in my garden fifty or sixty hills, placing the sets directly on the manure. To about one-half of the hills I applied a table-spoonful of salt, after slightly covering the seed to prevent immediate contact. I then finished covering. The hills so treated yielded potatoes entirely free from blemish, and of excellent quality. The produce of the residue was badly affected by rust (or scab) and worms, and was hardly worth harvesting."

Professor Morren also directs attention to the importance of salt as a means of repelling the disease. He recommends the tubers to be placed in a steep composed of 54 lbs. of lime, 7 lbs. salt, and 25 gallons water.

Mr. J. E. Teschemacher, speaking of the potato disease, in the N. E. Farmer, says:—"I think that salt, lime, and several chemicals will destroy the disease. I prefer salt, because when mixed in the soil, it may get into the juices, and circulate through the whole plant. Lime, or lime-water, would do the same, to a certain extent, but it is far less soluble than salt."

The following very interesting detailed experiment with salt was communicated in the 9th Vol. and 5th No. of the Cultivator, by J. C. Mather, a very intelligent and spirited farmer of Scaghticoke. He says:—"In the spring of 1838, we broke up six acres of sward land that had been mowed a number of years, intending to plant it to corn, but observed, when plowing, that the ground was infested with worms, (the yellow cut, or wire-worms, and black grubs;) as we had mostly lost our corn crop the year previous, by having the first planting almost entirely destroyed by the corn worm, (above described,) we expected a like calamity would follow the present year, unless some preventive could be used to destroy the worms. And having frequently and unsuccessfully used all the recommended remedies to destroy the corn worms, we were induced, at the suggestion of an English laborer, to try salt. After the ground was thoroughly harrowed, five bushels of salt per acre were sowed broadcast, leaving a strip of near half an acre on each side of the field, to satisfactorily test the experiment. The whole was then planted to corn and potatoes. The corn on the part where no salt was sown was mostly eaten up by the worms, and was replowed and planted to potatoes. The potatoes on the whole lot were a good crop, but decidedly better where the salt was applied. I regret that we did not ascertain by measurement the actual result. There was a very perceptible difference in the appearance of the vines during the whole summer. On the part where the salt was sown, they grew larger and were of a darker green color, and continued green longer in the fall than the others."

"In the spring of 1839, we spread on a good coat of manure, and planted it all to corn, except about half an acre of the salted land, which was planted to Rohan potatoes. The Rohans were the best crop of potatoes I ever saw. Seed planted, 2¼ bushels, produce over 300 bushels. The largest potatoes weighed 4¾ lbs. The corn was a heavy crop, but was not measured. The summer was very dry and hot; but the corn on the salted land did not appear to suffer at all from the drouth, while the other was consider-

ably injured. The salted land appeared always moist, and the growth of everything upon it was very rapid. We found great difficulty in keeping the weeds down. After three successful hoeings, we were obliged in August to give it a hand weeding. Spring of 1840, intended to have stocked the land down for meadow; but thinking it too rich for oats, planted potatoes without manure. Crop good. The effects of the salt still very apparent. Adjudged to be one-third more potatoes where the land was salted."

"Spring of 1841, sowed a part of the lot to oats, the remainder to potatoes and onions, without manure. The onions were a great crop. The summer was very dry, but they did not suffer, while other crops in this neighborhood, on similar soils, were nearly destroyed by the drouth. The oats were a heavy crop, and much lodged on the salted part. The clover grew well, and produced a fine crop of fall feed. This I cannot account for, except by supposing that the salt kept the land moist, or attracted moisture from the atmosphere, as I know of no other piece of land in the town that was well seeded last year: it was almost an entire failure; and the most of the land stocked down last spring has been or will be plowed up in the spring to be seeded.

"We sowed salt the same spring on a part of our meadows. The grass was evidently improved, the result satisfactory, and we shall continue to use it on our meadows."

At a farmers' conference meeting, held at Marcellus, Onondaga County, in November last, Mr. Brown, President of the County Agricultural Society, said, "he had used salt as a manure with great benefit. He sows it broadcast upon wheat and grass at the rate of three to five bushels to the acre. On grass he would sow it in the fall —for wheat he would sow it just before the wheat is sown. He found that three bushels of salt to the acre on his wheat field, occasioned an increase of seventeen bushels of wheat to the acre over that which had no salt. The soil was a strong loam with a stiff subsoil."

Cuthbert W. Johnson, a distinguished agricultural writer, strongly recommends salt as a manure, at the rate of from ten to twenty bushels to the acre, to be sown some two or three weeks before the seed is put into the ground. He says the benefits are as follows: 1st. When used in small quantities it promotes putrefaction. 2d. By destroying grubs and weeds. 3d. As a constituent on direct food. 4th. As a stimulant to the absorbent vessels. 5th. By preventing injury from sudden transitions of temperature. 6th. By keeping the soil moist."

It would seem from all the facts I have been able to collect, that salt corrupts vegetable substances when mixed in small quantities, but preserves them when it predominates in a mass; that in dry seasons its effects are more apparent, and whether it attracts moisture from the atmosphere, or whether it acts as a stimulant or condiment, is of little consequence so long as its effects are certain.

On account of the small quantity of salt, in weight, required for manuring lands, it is no inconsiderable recommendation, because on that account it may with ease be conveyed to the most rough, steep and mountainous parts, to which the more bulky and heavy manures most in use could not be carried, but with infinite labor, and at an expense far exceeding all the advantages to be effected from it.

For a top dressing, a composition of salt and lime, 4 bushels of the former and 12 of the latter, to the acre, has been highly recommended for grass lands infested with moss, and promoting a more vigorous growth of grass. Its beneficial effects on asparagus beds are well known to gardeners, giving a deeper color and a more vigorous growth to the plants.

Salt itself is considered, by some, rather too harsh in its nature, but mixed with ashes, say six of dry ashes to ten of salt, well mixed together, which is sufficient for an acre, and spread upon the furrow and harrowed in. By being thus mixed, one particle incorporates and mollifies the other, and if conveyed into the earth by a soapy, smooth method, will prove the real enricher the earth wants, to send forth vegetation.

MANAGEMENT OF MANURE.

It is always best when made under shelter, and perhaps no better can be made, other things being equal, than in Mr. Warnes's system of box-feeding, where the litter accumulates under the animal, and is applied in quantity sufficient to absorb *all* the urine. It is surprising what a quantity of excellent manure may thus be made. An ox in a box 10 feet square, and well littered every morning, will rise in its shed only about three inches a week, but the manure below it is hard, compressed, and will monthly, when turned out, form a heap of at least six cubic yards of first-rate material, containing, as it does, the whole of the urine. We clean out our boxes monthly, cart the materials to heaps in the fields for our turnips and other root crops; and in turning it over mix and cover it well with the earth on which it is laid. It is taken always to that part of the field where there is the thickest soil, that the land may not suffer from being thus robbed. The sheep-dung, the sheep being fed under sheds, is allowed to accumulate for a month also, and is taken away to heaps in like manner. The stable-dung, and that from the cattle stalls cleaned out every day, is taken to a heap by the liquid-manure tank, with the contents of which it is soaked whenever the tank is full, and it is also well soaked when it is carted away in spring to the field. Dung, as we understand, does not contain, *when perfectly fresh*, much ammoniacal matter, but it contains that (mucous matter and urea) which forms (chiefly carbonate of) ammonia during the process of putrefaction which almost immediately ensues; and it has been contended that if spread out in the field, when perfectly fresh, on the surface, or at most under a very slight covering of earth, its nitrogen compounds would form nitrates, and not compounds of ammonia, and thus be as available as vegetable food, with less risk of waste. Nitrates are very rarely found in our soils, and that is against the theory, but the doctrine is nevertheless a fair subject for experiment, and to test it, when clearing out the cattle boxes, let, say 30 tons, be spread at once on an acre of plowed stubble for the Swede crop of the ensuing season, and another 30 tons put in a heap on the land and turned, mixing with earth, &c. according to rule, and then in April or May plow it in on an adjoining acre—the resulting crop, if managed alike in every other respect, will tell the truth on *this* point. Farm manure may be considered, on the average, as containing about 10 lbs. of nitrogen in the ton; this, in the ordinary

course of putrefaction, will form about 23 lbs. of carbonate of ammonia, to fix the ammonia of which requires 35 lbs. of the sulphuric acid of commerce; it will, however, be safer to use a smaller quantity, and it may be thrown among the liquid manure with which you soak the heap; 70 or 80 lbs. per ton of the common green vitriol will answer the same purpose, and as for sulphate of lime (gypsum), which is to a certain extent a fixer of ammonia, it may be well to apply an excess of that, as it has a value of its own as a manure; 1 cwt. of it may, therefore, be mixed per ton of the manure. Farm dung should be turned once and mixed with earth shortly after being carted out to the field in this month, and then again three weeks before it is applied: the first turning will cost 1d. and the second ½d. per cubic yard, measured *before* turning.

Liquid manure may be applied either by soaking manure heaps, or it may be hoarded up in tanks till spring and carted out in water-carts on the land—in the latter case it may be well to *fix* the ammonia, which, when putrefying, it contains. And to guide to the economical performance of this, we may mention that 17 lbs. of ammonia require about ¼ cwt. of the sulphuric acid of commerce for its fixation, and that the same quantity of sulphuric acid is contained in about 1¼ cwt. of sulphate of iron. Now, fresh urine, averaging all that is produced from the various animals on the farm, may be considered to contain about 2 lbs. of ammonia in 10, or 12 gallons, *i. e.* in 100 to 120 lbs.; and the horse yields 3 to 5 lbs., the cow 30 to 40 lbs., and the sheep and pig probably 2 or 3 lbs. of urine daily.

It must not be forgotten that the value of manure depends not only upon its nitrogenous or ammoniacal compounds, but also upon its mineral parts—and it differs greatly in these, according to the food and the age and condition of the animals which produce it. It is believed that the greater value which every farmer recognizes in the dung of cake-fed beasts arises chiefly from the greater quantity of phosphates which it contains—those phosphates being contained in the food of the cattle. And the great difference in the value of their manure between a full grown half-fat ox and a milch cow or a young beast, arises from the latter requiring all the phosphates in their food, one for the growth of its bones, and the other for the secretion of its milk, while the former, requiring them for neither of these purposes, passed them out in its manure. Manure also depends for some of its value on its bulk—its influence on the texture of the soil; but this, while sometimes beneficial, as on clay soils, where it ought to be applied fresh, is sometimes injurious, as on light soils, where, accordingly, it ought to be kept, if this can be done with safety to its volatile ingredients, till it is rotten and of an unctuous texture. It would be beneficial if the terms on which farmers hold their lands were so modified as to allow of their changing the cattle food produced on their farms for any other kind of cattle food they might prefer—they would then be able to buy or to sell straw according as a stiff or a light soil appeared to them to require a bulky fibrous manure, or one of a more condensed and less bulky character, and all this would be attended with benefit, not only to themselves but to their landlords also.

BONE MANURE.

This is one of the manures which appears not to have attracted the notice, or to have gone as extensively into use it ought to do.

It would be gratifying to hear from our friends in Montgomery what have been the results of their farther experience, and to have their opinion of its intrinsic value at the prevailing prices, and their estimate of it in comparison with other manures.

It seems to maintain its ground in England, where the value of all manures has been calculated on the basis of experiments, numerous, varied, and exact to a degree that it would seem to be impossible to carry out in our country.

At a late meeting of a Farmers' Club in England, a paper on the analysis of the soils of Carnwinick Farm—the property and in the occupation of C. H. T. Hawkins, Esq.—was read by Mr. Karkeek, of Truro. Its object was to prove the durability of bone-dust as a manure for a period of ten years. It appears that, in 1835, a piece of waste ground was broken from the common, and tilled to turnips, the larger part of which was manured with bone-dust, at the rate of three quarters to the acre.* In the two following years it was successfully cropped with oats, and with the last crop laid down to permanent pasture, in which state it has remained ever since. At the present period, the effect of the bone-dust can be plainly distinguished—the grass, as far as the eye can reach, having a rich grass sward; while the adjoining part, where no bone-dust has been applied, has a coarse, sterile appearance: the difference being as great as if a line had been drawn between rich pasture and scanty, coarse herbage. This, and a great many other experiments of the same character, made by Mr. Trethewy, the manager of the estate, amounting altogether to 120 acres, and on all of which the effect of the bone was equally visible, induced the Club to send a sample of the soil from each part of the field on which the first experiments had been made, to Mr. Hunt, late of Falmouth, and now "Curator of the Museum of Economic Geology," to be analyzed, in order to ascertain if the bone could be detected at the present time. It should be

* It should be properly added that the whole of the turnip plant was carried off by the fly; consequently, little or none of the bone-dust was used in that crop. This will partly account for its evident durability.

observed that Mr. Hunt was kept altogether ignorant of the object of the Club, and that the result was perfectly satisfactory, inasmuch as he readily detected the bone in that portion of the field, on which it had been applied some ten years before. The following are the analyses:

Substances.	*No.* 1.	*No.* 2.
Water, evaporated by stove drying	14·06	14·18
Vegetable and animal matters burnt off	12·01	12·05
Silica and siliceous grit	49·54	49·50
Oxide of iron	7·03	7·00
Carbonate of lime	1·05	1·06
Carbonate of magnesia	0·25	0·35
Sulphate of lime	1·05	1·04
Muriates	0·54	0·54
Alumina	7·10	6·04
Phosphate of lime	0·10	0·75
Phosphate of magnesia	0·00	0·05
Potash	1·00	1·27
Humus and soluble alkalies	6·00	6·17

Mr. Karkeek contended, from these analyses, that the experiment went to prove a plain and important fact, and one which is considered a disputed question among agriculturists—that the principal manuring properties of bone existed in the earthy matters, which constitute about two-thirds of bone, and not in the oily and glutinous parts constituting the remaining third.—An interesting discussion ensued on the subject of the analyses—the Club being of opinion that the organic parts of bone evidently had a powerful effect as a manure, but that it was next to an impossibility that any other than the earthy matter could have remained so long in the land—the whole of the animal matter having been probably consumed by the two crops of oats; and they agreed with Mr. Karkeek that the principal manuring properties of bone existed in the earthy phosphates.

JERUSALEM ARTICHOKE.

Helianthus Tuberosum, Linn.

We find the following Essay on the culture, properties and value of the *Jerusalem Artichoke*, in a late number of a news and political paper, the South Carolinian. Prompted by his own good taste, the Editor compliments his readers by supposing that information like this may be as acceptable as never-ending *party* disquisitions and abuse of political opponents, and hence his paper is often enriched with suggestions on the subject of Agriculture and Horticulture, far more important and useful to his patrons than such as serve to keep the people in the Country in a state of perpetual and, too often, angry excitement; breeding ill-blood between neighbors who ought to live like brothers, and drawing them off from the improvement of their estates, the education of their children, and the cultivation of their own minds and resources.

It seems to be clear, that besides its value as a provision for other stock, when dug up and preserved, it may be had recourse to with great profit as a *pasture for hogs*.

JERUSALEM ARTICHOKE.

This plant having recently excited some attention among agriculturists as a valuable root crop, we proceed to give a few hints respecting its culture, derived from our own experience, together with some account of its yield.

Although it is called so, it is botanically in no way allied to the Artichoke, but it is of the same genus of the sunflower, which it much resembles. The term Jerusalem is, according to Webster, a corruption of girasole, the Italian name for sunflower; and it derives the appellation of Artichoke from some fancied similarity in the taste of the tubers with the Artichoke bottoms. It is a native of Brazil, and was first carried into England about the year 1620, and before potatoes were so generally in use, was extremely popular as an edible root. Mention is made of it in old agricultural treatises, as the *Canada Potato*, to distinguish it from the common potato, and it was sometimes called the *Virginia Potato*. It was regarded as wholesome, and is of an agreeable taste, though it is never dry and mealy like the potato, being rather moist and soft in its texture, and is nutritious. Being hardy and perennial, it succeeds in almost all kinds of soil. It was almost lost sight of in Agriculture, until within a few years. Latterly it is obtaining notice as an article of food for domestic animals.

Twelve or fifteen hundred bushels have been obtained from an acre, when properly cultivated, and being relished by horses, cattle and hogs, it is undoubtedly the most profitable root crop which can be planted in the South; and perhaps it might succeed in more northern regions. It is rich in farinaceous substance, and all animals do well and improve when fed upon them. Last spring a friend sent us a quart of tubers. We did not think this small quantity worth planting, as they were much injured and dried up by long exposure. On the third of May, fully two months after they should have been planted, we had a small space of ground, about two rods, prepared, and put them in. A drouth ensued, and they did not come up soon, and consequently lost a great deal by their being so late. They were planted in drills two and a half feet apart, and twenty inches in the drill; but the seed being so badly injured, the plants were very irregular. They were plowed once, and the grass and weeds afterward removed with the hoe. In November we had them plowed up, and upon gathering them found we had ten bushels; and it is our opinion that, if they had been picked clean from the land, the yield would have reached twelve bushels. The tubers filled all parts of the soil, and some of

them are two feet long, consisting of small bulbs connected by succulent roots.

The roots are white, and extremely tender, while the tubers are slightly tinged with red. The roots make the best slips for planting, and, if cut up, leaving an eye to each slip, they readily vegetate. When it is intended to feed this crop to hogs, they require no harvesting, for they readily withstand our mild winters; and if the hogs are turned in on them they usually provide for themselves. For calves, sheep and horses, they must be gathered and washed, but, unlike other roots, they require no cutting up. They might be fed to sheep, by merely plowing up a few daily, and letting the sheep eat them immediately from the ground. In consuming this crop, the hogs gave the ground a thorough plowing, and by turning under the stalks and leaves, they add much to the soil. Some have asserted that it is an exhausting crop, but from the genus of the plant we infer it is not. The leaves are large and the stalks are crowned with beautiful yellow flowers.

The above was substantially the contents of an article contributed by us to the *Albany Cultivator*, for February, 1845. In the spring of 1845, in preparing the plat of ground spoken of, for potatoes, more than six bushels of tubers were gathered, (making the yield sixteen bushels), which had not been affected in the least by the frost, and vegetated finely. The ground was planted in potatoes. but there still remained innumerable small tubers of Artichokes which had not been gathered, and these vegetating brought up a fine stand before the potatoes came up. They took possession of it, and instead of a crop of potatoes, one of Artichokes was raised, which produced the second year over twenty bushels on the ground above mentioned. Our experience of the prolific nature of this plant does not cease with the two instances above mentioned. Several acres were planted in a peach orchard at Pomaria, last year, and under all the disadvantages of dense shade, drouth, and exhausted soil, they produced quite a fine crop; and its adaptation as food for swine has been fully tested. A number of sows and pigs are now running on this last-mentioned lot, and keep fat on what they glean from the field, which has been partially dug over, without a particle of other food. It is a great promoter of milk in all animals, and fully sustains the opinion above expressed concerning its being good food for cows and sheep. It would, perhaps, supply better food for ewes and lambs than any other root crop we could grow, as the tubers are extremely succulent and embody more farinaceous matter than is usually allowed to it, by those persons who wish to discountenance its culture, because the Artichoke happens to contain 76-100 parts of water. The great quantity of this constituent renders it the very best article which we can give to our stock, in conjunction with the dry food which we feed out in winter. This is wisely ordained by the Creator, who with the powers and mightiness of omniscience has thus constituted vegetable substances, in order that they may be fit and proper food for the beasts of the field without the artificial aids of preparation, which man is forced to apply to the articles of his diet. Owing to the large yield of this root, we are fully satisfied that one acre of it *will furnish more farinaceous matter* than an acre planted in any other root crop. The Jerusalem Artichoke contains *one-third* more nutriment than the beet, which is extensively cultivated in France as an article of economical food. It will compete and far exceed the yield and profit of the carrot in our soil, being more nutritious, and at the same time more productive; it will grow luxuriantly on soils too poor for the different families of the potato, the beet or the carrot, and we have tested its powers of withstanding drouth and cold; for our crop grew well amidst the desert heats of the last summer, and the roots which remained in the ground during the late severe winter, have not been injured in the least; while it is never attacked by insects or disease, both so fatal to the interests of root crops in the southern latitudes. We believe, from a fair trial, that it is destined to take the first rank among cultivated roots, and finally work great changes in the economy of feeding domestic animals. The shading of old worn-out lands by a plant which lives from atmospheric sources, should be sufficient inducement for its general cultivation. Yvard, the distinguished agricultural Professor at Alport, recommended its cultivation both by precept and example. Arthur Young affirms the net profits of its cultivation to be much greater, beyond all doubt, than that of any other ordinary agricultural production; and finally, it remains in full production on the same spot for ten years and upward.

Our experience induces us to prepare the land and plant them as follows: Break up the soil as deep as you can in the winter, either with turning, Eagle, or subsoil plows; as soon as the frost is out of the soil, in February or March, cross-plow it with the common twister or corn plow, so as to have the land perfectly friable; lay it off in rows two feet apart, and drop the tubers, prepared for planting by being cut into pieces, ten inches apart in this row; cover them with a plow. When the plants are ten inches high plow them over, following again when they become twenty inches high and the crop is made. They grow well in any soil, and being a hardy perennial, flourish for a score of years on the same soil. They can be eradicated by hogs, but will always come, even after the hogs have gleaned the field, in sufficient quantities to make a crop the next year. After the first year, *instead* of *planting them*, they must be plowed down to a stand by three or four workings as soon as they come up in the spring.

CEMENTS.—A correspondent in an English paper says: 'A Subscriber' asks if India-rubber can be successfully used to render slate cisterns water-tight. I can recommend a cement which he will find to answer his purpose. I have known it used in the formation of an aqueduct 450 feet long and 5 feet wide, which was water-tight the whole length. It was lined with flooring-tiles, set in the following cement:

Cwt.	*qrs.*	*lbs.*		*s.*	*d.*		*s.*	*d.*
1	0	0	Whiting, cost, at	4	0	per cwt.	4	0
0	2	18	Rosin, "	11	0	"	7	0
0	0	18½	Brimstone, "	21	0	"	3	10
0	0	9	Tar, "	4	6	"	0	5
1	3	17½	Cost.....				15	3

EXTRACT OF PEACH BLOSSOMS.—Essence of lemon 1 oz.; *pure* balsam of Peru and essence of bitter almonds, of each 1 dr.; bitter almonds 1½ lb.; rectified spirit of wine 3 pints; spirits of orange flowers 1 pint; spirit of jasmine ½ pint; macerate. Very odorous.

[Cooley's Cyclo. of Prac. Receipts.

EXPERIMENTS IN GROWING POTATOES.

CONEWANGO (near Warren), Pa. }
March 18, 1846. }

JOHN S. SKINNER, Esq.

Editor of the Farmers' Library:

IN the December Number of the FARMERS' LIBRARY, you remark that you have never known a period when two subjects engrossed as much of the public attention as did the potato disease and the railroad mania in England.—You seem to think, however, that the potato disease does not prevail with us to an extent sufficient to justify the appropriation of much space (where space is so precious), but that it may be well to keep inquiry alive, &c.

With this view of "keeping inquiry alive," I communicate some experiments which I made last season. I think, from your long experience, you will agree with me that an ounce of prevention is worth a pound of cure—that one perch of fair experiment is worth an acre of theory. The first appearance of the disease in potatoes in this region was in 1843. Some fields on low, moist land were infected a good deal in that season. In 1844 it increased considerably; probably one-fifth of our crops were injured or lost. In 1845 it still increased; I think the loss in our crops may be safely put down at one-third. Knowing, as I did, the progress of the disease, before I planted last spring I availed myself of all the information on the subject within my reach; among the most valuable was contained in a series of articles, from different authors and sources, in Ayelworth's Reports for 1844. Lime and plaster, particularly the former, were reported as the best preventives. I adopted both.

May 10th—plowed 120 square rods sandy loam, in good tilth, but not rich. A crop of corn and one of rye had been raised on it since manuring. Dragged it well, and struck it out into furrows 3½ feet apart; cut my seed (a middling-sized potato) into three parts; wet it; put on as much lime and plaster, in equal parts, as would adhere to the seed; dropped in the furrows 16 inches apart; covered them with rye straw, and turned a furrow each side on to the rows.—When they were 6 inches high, sprinkled plaster on the tops, say a peck on the patch; hoed twice; and harvested on the 10th of October.—Yield, 85 bushels of as fine potatoes as I ever raised or saw—not a rotten one among them. I planted three varieties—the Irish Gray, Mechanic, and Pink-Eye—all were equally good.

May 20th—Planted 35 square rods on one end of my corn-field, where an old fence had been removed; soil similar to the first, but less worn. Prepared the seed by wetting, and rolling in plaster only. Yield, 25 bushels. Found at harvest some few rotten, say half a bushel in all.

July 1st—Broke up one-quarter of an acre of old meadow land on a small run of water; soil somewhat clayey. Planted without any preparation of the seed; hoed once; dug them 1st of November. Yield, 30 bushels—small, and about one-fifth rotten.

This last experiment was in pursuance of a suggestion, in the report referred to, that potatoes not fully ripe were better for seed—being more vigorous to send forth the shoots, &c. I have saved the best of this last crop for seed, and shall plant them the coming season.

Respectfully,

LANSING WETMORE.

Last season was unusually dry. The first-mentioned patch was covered deeper than is usual to cover potatoes. Whether this, or the rye straw, or the lime and plaster, had a tendency to increase the crop, or whether all combined, those who are versed in the chemistry of Agriculture may best determine. L. W.

HOW TO OBTAIN THE BEST POTATOES FOR PLANTING.

At a Farmers' Club in England, Mr. Stephens read a communication from Mr. A. Tod, market gardener, Easter-road, near Edinburgh, on a successful mode, which he had practiced for several years past, of raising Potatoes for seed, and which Mr. Tod considered might also be practiced by farmers who wished to raise good seed Potatoes. After referring to the observation he had frequently made of Potatoes which had grown deep in the soil being mealy and fit for the table, while those which were formed near the surface of the ground were waxy, and consequently unfit for the table, yet made good seed—he alluded to the conviction which this circumstance brought to his mind of the propriety of always raising Potatoes for seed, and those for food in different ways, and he was the more anxious to treat the Potato differently for these different purposes, that he had suffered largely by failures in his early Potatoes. His suggestions for raising seed Potatoes are therefore derived from his own experience, and we believe they will be best understood in his own words. "The remedy I venture to suggest," says Mr. Tod, "is simple and practical, and within the reach of almost every farmer, and of a character that it may be easily tried to a greater or less extent, according to circumstances. I propose that a portion of land most suitable for the rais-

ing of seed Potato should be selected, and, if it require manure, let it be applied and plowed in during the autumn and winter months. In the spring, let the ground be wrought into a fine, friable state, and plant the seed to the depth of two inches, and no more. During the summer, let the ground be kept loose and free of weeds, but do not earth up the plants. In autumn, lift the crop as soon as the stems begin to lose their greenness. By this method the crop will be as large as by the ordinary way; but, what is of more importance, the germinating powers of the Potato will be found greatly improved and invigorated; for the greater number of the tubers having grown above ground will have the advantage of the light and air to form and strengthen in the buds or eyes, and therefore will be much hardier and not so easily injured by rain or frost as those grown in the ordinary way."—In conclusion, Mr. Tod says—"Before I adopted the above method, I had, for several years, failures in my crops of early Potatoes—more especially in the Ash-leaf Kidney and the Adelphi Early—but observing that such tubers as were accidentally growing above ground, exposed to light and air, had well-formed, strong and vigorous eyes or buds, I resolved to adopt the said method of growing my seed, and have done so fo. the last four years; and the result is that my crops are considerably larger than they were, and have now no blanks." To a question put from the chair, Mr. Tod replied that he cut his seed into sets when the Potatoes were large, but planted the small Potatoes whole. He considered it, however, of the greatest importance to manure the soil in autumn or winter.

POTATOES FROM THE SEED.

A WRITER in a late number of the *Mark-Lane Express* assumes with confidence, that the disease in Potatoes is caused by the sorts in use having "worn out and become tired of the soil;" and recommends *renovation by planting the seed.* For *preserving* the seed, and the procurement of new varieties, he makes the following practical suggestions, which may be of use to the few pains-taking people, who are sometimes jeeringly called *experimenters*, and without whom, it is hard to say how many of our best vegetables and fruits would have been either obtained or preserved.

"Having three times, during a long life, raised Potatoes from seed, and minutely observed the progressof vegetation from the period of sowing to the maturity of the crop, and having given my best attention to the culture in every stage, my practical experience and observations convince me that the time has now arrived which makes it imperative to renovate the *Potato by Seed.* The first step in this experiment, is to collect the balls, or seed berries, or Potato-apples as they are called, and place them in dry a situation; but these would have been found with greater facility before the late crop was raised, yet there are a sufficient number to be found scattered about the land where they grew on every farm. The apples having been hoarded till as mellow as ripe plums, must be squeezed by hand in a basin of water, till the tough skin and pulp are well separated from the seed, the latter of which will readily quit the former, and precipitate to the bottom of the basin; the water must be poured off and the seed spread thinly on a coarse cloth to drain and absorb the remainder of the water; and then removed and spread upon brown paper, and when perfectly dry, must be well preserved till the following spring for sowing. I have found the most favorable time for depositing the seed in the ground, well pulverized, is the second week in May, or thereabouts; at this late period the probable occurrence of frosty nights may be less prevalent than at an earlier sowing, as the tender plants springing up are extremely susceptible of the least frost. The operation of sowing may be performed precisely the same as with onion seed,and there will be no particular care to be farther taken before the time of transplantation. The seed will come up freely, and the plants, when elongated three, four, or five inches, should be carefully raised with as much root as possible adhering, and removed into small trenches ready to receive them, and planted to the depth of the under leaves, distant about six inches apart in the trench, the trenches being about fifteen asunder; and the earthing up may be performed in the usual way as the plants progress; but the transplanting operation will be more favorably done should the earth then possess natural moisture. As the plants advance toward maturity, some will exhibit great luxuriance a long time, and others will sooner appear to droop: the latter indicate an earlier sort, and may be distinguished by placing a little stick at the ham. The process now terminates; but the fruits of the labor in raising the ripe crop will present a scene to the operator truly wonderful and amusing: he will behold among the vast variety of new Potatoes at the roots, from the size of a pea to that of a pullet's egg, purples, whites, flats, rounds, reds. kidneys, &c., &c., in fact, such demonstrations of the sports, freaks, and vagaries of Nature as are truly astonishing. These new roots must be planted whole the following season and after, they will be in perfection for selection as future stock."

CLARIFIED BUTTER.—Melt fresh butter by placing it in a vessel set in a water bath, let it settle, and pour off the clear into an earthenware basin or pot, set in cold water, to cool it as quickly as possible, without letting it crystalize. It keeps a long time without becoming rank. Cooley's Cyclo. of Prac. Receipts.

No. I.....NOTES, AGRICULTURAL AND MISCELLANEOUS.

RAMBLES IN THE SOUTH....*Fiat justitia ruat cælum.*

LONG-LEAF PINE—TURPENTINE.

If my memory, the frailest of the frail, deceive me not, I wrote you, Mr. Editor of the Farmers' Library, early in February last, in respect of various matters and things whereof I have now no very distinct recollection. My letter was dated at a certain P. V. yclept *Hicksford*, the capital town of Greenville County, Va., where I was "putting-up" with Major Blunt, a plain, but not a "blunt man," being one of easy access and sociable temper, who had, like some others, broken up an old family homestead and moved out to Mississippi, and then—moved back again; either because he had expected too much, or did not find it the place it had been cracked up for, as they say in the West. There at Hicksford aforesaid, my friend Major B. has "opened tavern," and resolutely determined, for the residue of his days, to use his own words, to "take the world as it goes;" good enough philosophy, it must be admitted, provided we exert ourselves faithfully to *make it go right!*

Here it occurs to me, in how many of the walks and occupations of this life, are the various duties of the *Housewife* more important than is usually acknowledged, and, in few instances, is this more truly the case than in the management and labors of these country or village Inns. While the name of the landlord heads the bill, and swings forever in conspicuous letters on the sign, who is it that drudges in the back-ground, and keeps the chambers in order, and sees the table spread with refreshments for the way-worn traveler? Let him then, while discharging the reckoning with "base lucre" to the landlord, offer the poor tribute of his thanks to her whose housewifely cares have refreshed the inward man, and sent him recruited on his journey.—In the spirit of my motto, that in which I shall speak of all I see, "*Let Justice be done, tho' the Heavens fall!*"

Devoid as old country villages may be supposed to be, of intellectual resources and cultivation, those who seek them in a proper way, may, at most of them, find their own equals, at least in general intelligence, ready to communicate what the inquiring traveler may desire to learn, either of the natural resources or industrial products of the surrounding country. But, alas! how long, to the shame of Agriculture and all other pursuits, shall it remain, that for men of a higher order of intelligence, and familiarity with all that is most worthy to be known, you must everywhere go, in our country, to the *Doctor and the Lawyer?*—not only for information in respect of the constitution and laws of a particular State, and the peculiar diseases of the particular locality; but for its Geology, its Natural History, Climate, Productions, and local capabilities for Manufactures, Commerce, and all the various branches of Industry! Why should not every young farmer be, by our systems of education, and in conformity with an improved public sentiment, as variously and thoroughly instructed on general subjects, both scientific and literary? Do not his daily walks and pursuits lead him, above all others, to observe and invite him to study the science which treats, not alone of the elements of the farm he cultivates, but of the earth in general, and the various relations which the different masses of which it is composed, bear to each other—as well as to study all those parts of Natural History which relate to the plants that are growing, the animals that are feeding, and the birds that are flying around him?—Is it not before him, and for him especially, that Nature spreads out her ample volume, in which every page has its interest? Is it not emphatically in the view of the agriculturist, that

> "Link after link the vital chain extends,
> And the long line of being never ends?"

Until public legislation shall have established systems of education that shall open the way to, and ensure a knowledge of, the sciences connected with the practical exercise of the agricultural art, why indulge in vain and preposterous boasting about the freedom of our Political Institutions, and the universal and direct agency of the People in the entire action of the Government? To possess and not to use such freedom for that interest of Society which so much transcends all others, is to abuse it; yet what have the People, the landholders of the country, done toward ensuring Governmental provision for instruction in *Agriculture*, or in smoothing the way of *its* products to market; while they have been paying hundreds of millions for military instructions, military maps, and military roads and surveys and ships? What is the Press of the country doing to the formation of a correct and redeeming public sentiment on this subject? Is it not of legal enactment that if you would have your son get a *life* commission, to glory in

conscious exemption from the vicissitudes of party, and the caprices of power, you must make interest to get him in the *military?* and is it not the common public impression, that if you would have him acquire intellectual renown—be the ornament and the focus of attraction in the public councils, or the social circle—in a word, a man of consideration and influence in the world, he must eschew all thought of being a tiller of the soil, on whose products all professions live, as the mistletoe on the oak, and betake himself to the office of *the Doctor or the Lawyer, or to the Army, or the Navy!*

But this is a digression suggested by the residence at that ford of the Meherrin called Hicks'. as aforesaid, of Doctors M..... and B..... possessing, either of them, talents and information enough to relieve a larger place from the discredit of being wanting in intellectual refinement.

Lands through that region of country traversed by the great Southern line of railroad, may be had—many farms, with dwellings as good as those of the opulent Creole Planters on the Mississippi, for from $2 to $5 an acre on long time. Cotton is still cultivated there, but not with results to remunerate the labor and capital employed in it. There, as well as at Petersburg and Richmond, there is a vast amount of natural water-power unoccupied, but that resource, like some others, has been exploded or impaired by the application of steam-power to manufactures in large towns, to and from which the raw material and the manufactured articles are borne on the wings of Commerce, and where capitalists choose to employ their means under their own more immediate supervision.

Were it not that I would avoid another digression, although my roving commission carries with it no obligation to sail any given course, it would not be difficult to show that all that part of Virginia at all distant from navigation, and of which *Grain* or even Cotton is the staple, must be, sooner or later, and is now fast being, abandoned. It will not pay expenses and repair wear and tear. The ship so manned must ultimately go down; and those who soonest discover that there is a leak in the bottom which may be patched and caulked for a time, but can never be permanently stopped, will save the most from the wreck which is inevitable. Your readers in the North will hardly believe that there are many hundred thousand acres of land in Virginia, that may be purchased for from 20 cents to $2 an acre; and, in the high regions of Georgia, may be entered 160 acres for $15.

A circumstance which seems to indicate that *want of thought* (not knowing what else to call it), which is too characteristic of agriculturists, is the practice of advertising their lands, when they wish to sell, so *exclusively in the local neighborhood papers*—thus circulating their notices among those so many of whom are in the same condition with themselves. Common sense would seem to suggest that notices of commodities for sale should be distributed where there is the greatest probability of demand, and means of purchase; and not where all are alike sellers and none buyers—or only a few, who lie by, with their money-bags, ready to pounce on the victim of imprudence or misfortune, as the spider on the luckless fly that falls into his web.—The practiced, keen-sighted merchant, in this as in other things, shows more sagacity. He sends his advertisement to the region, however distant, where it is most *likely to tell.*

From Hicksford you proceed by railroad in one night to Raleigh, if curiosity or business should lead you to the capital town of the Old North State. There is to be seen, probably, the handsomest Capitol of any State in the Union; but what enterprise of that sort does Southern enterprise carry out? The grounds around this beautiful building, so susceptible of easy and elegant embellishment, remain as open commons, where any beast may pasture and repose in the shade of its native oaks. The building cost, it seems, so much beyond the estimate, as is usual in such cases, that both parties are afraid *to risk their popularity* on voting the sum of a few thousand dollars to enclose and improve it.

Raleigh is distinguished as the residence of Mr. Badger, an eminent lawyer, whose income for twenty years has been from 6 to $10,000 annually. He was Secretary of the Navy under Mr. Tyler, and resigned on finding, as he stated, that that gentleman had determined to repudiate what he had authorized his Cabinet to promise, in his behalf, on certain measures of importance.

I was struck, on the Gaston and Raleigh Railroad, with the singular process adopted for *watering the passengers!* Occasionally, through the night, Cuffee enters at one door of the car, and passes on slowly to the other, with a large stone pitcher in his left hand. *En passant*—a drowsy passenger, between waking and sleeping, grasps at the handle of the pitcher, supposing he is to take his drink by word of mouth; but Cuffee holds fast, and, without even casting his eyes in the direction of what is going on, only and briefly remarks, "*Gourd in dar.*" This is all he can be provoked to say. At last the passenger begins to apprehend him, and, thrusting his hand into the pitcher, pulls up a gourd full of water, of which he partakes what his thirst demands, and, having no place for the residue, lets fall the whole again into the pitcher—when Blacky (Cæsar, or Wellington, or some such great character) proceeds, and as another passenger awakes, and reaches to take the pitcher, he again is told, "*Gourd in dar,*"—and thus the passengers are watered about as often

through the night as the engine itself. Those who are not for Raleigh pass on from Gaston directly to Wilmington.

At various points on the road, I heard anecdotes and facts illustrative of the loyalty of the blacks, and of the total absence of any general feeling of wrong or churlish discontent at their condition. On occasion of the Court House at Raleigh taking fire some time since, and endangering the public records, the blacks labored with voluntary and indomitable energy and devotion, and with a spirit of perseverance so desperate that the whites were obliged, at last, to stone them out of the upper story, lest they should perish by the falling in of the roof.—When, at last, they were forced to retreat, one of them, with evident chagrin, observed to his master—"Lord, sir! if the white folks had n't druv us out, we could ha' saved *the vally o' three niggers!*" The truth is that the slaves of the South plume themselves very much, each on his own supposed value to his master. On one occasion, a gentleman was going to the west, but was embarrassed to know what he should do with a valuable and favorite servant, whose wife belonged to a neighbor. It occurred to him to propose to exchange his man, with the neighboring owner of the man's wife, for one of his men who was unmarried, and perfectly willing to go, but made strong objection and presented much difficulty on the ground that *his* master would lose by the bargain, as he considered himself worth at least $100 more than the man who was to be taken in exchange for him; and was, at last, only reconciled when he was given to understand that the boot he named would be given in the *swap!* In this matter of exchange and sale of favorite servants, great sacrifice of feeling and of property is frequently and reciprocally made, and arrangements for removal to other States, promising the most advantageous results to slave owners, are not unfrequently abandoned because of the difficulty of effecting these exchanges or purchases in a way to enable them to go without involving painful separation of favorite family servants.—And yet it is wonderful to those who are not aware of the short-lived nature of all their emotions, how soon absence assuages the pang of separation with these people, especially on the part of those who are removed and "gwine away to the wild-goose country," as their song goes. The voluntary and permanent rupture of the nearest ties of blood and kindred, on the part of white emigrants that throng every mode of conveyance from the east and north to the south and north-west, are far more numerous than the forced removal of kindred blacks to climates much more congenial to their constitution.

Inquiring of a negro woman at Raleigh if she supposed the Governor was then in the State-House, she answered, "No, sir, he is at the *Palace*," in a way so familiar as to show that Palace is there the common designation for the Governor's House.

From Raleigh the next day, in one of Col. Guion's excellent lines of stages, I struck the railroad again at place called Goldsboro', and there took the cars for Wilmington, where you arrive early in the day. Barren as is the road from Raleigh to the Point above mentioned, even that line of observation is not without interest to a man whose disposition leads him to find knowledge or amusement as well in a by-path, as on the highway—as well in a hut, as in a palace. Here I was amused and had many a youthful reminiscence revived, by observation of the primitive simplicity and mode of living kept up since the first settlement of the country. In the simple habitations we entered to get warm, or to get a gourd of water, or it may be to indulge not ill-intended curiosity, we saw young women dressed in "home made," still plying the shuttle at the rate of about six yards a day, in a loom at least a hundred years old. Not one inch of advance in the art of weaving has been made for a century, and probably another will pass before even the flying or spring shuttle will reach them. In the corner of an old fashioned fire place, big enough to roast an ox, sat the old lady, either knitting or making up cloth of her own spinning, which they say "wears so much better than *store-cloth*." Over the mantle in its amplitude, and at a goodly hight, hang the turkey's wing, the almanac, some bunches of red pepper, and small bags of seed, with divers other things, which, (or things of the same kind) have hung on the same nails time out of mind. As the light flagged, the old lady would throw on a billet of fat "light wood," which lay conveniently at her feet, and on surprise being expressed that she could work altogether by fire-light, she remarked with honest simplicity, "Well, if you haint got no light wood whar you live, how *do* you see to work?" Nothing truly can excel the attractive cheerfulness of these bright blazing light wood fires as you pass on a cold night along the pine forest roads of Carolina. At Smithfield we got a dinner that for comeliness and cookery, far excelled the fare of the great hotel at the Capital. Here to my agreeable surprise, I met with an old and intelligent Turf-Register acquaintance and correspondent of yours, Mr. Editor, in the person of Col. John M. L ...,who has much experience in the cultivation, if it may be called, of *tar and turpentine*, the great staples of this part of the country. From him, as from others after him, I learned that I was now passing in fact, through the very heart of the tar and turpentine region; and with no little astonishment on my part, at the profitableness of the labor employed

in collecting and making them, and with yet more surprise at the seemingly endless value of that quality of pine, all of which is so little known out of the immediate neighborhood in which they are produced. From brief notes made in passing, and farther information promised, I may furnish you, for an early number, with a full amount of the whole process and the results.

The reflections induced, in connection with the growth of this species of pine, are strange and important in a view of the distant future: as for instance: The wings of marine commerce of the whole world, it will be admitted, would be clipped, if not entirely destroyed, but for the use of the product of this beautiful evergreen; and yet, from some mysterious operations of Nature, or the spread and influence of civilization, of which commerce is the great promoter, it would seem from present appearances, according to all I heard, that a stop has been put to the successions of its growth which has been going on for centuries. The time is thus approaching, according to the opinion of judicious observers on the spot, when scarcely a vestige will remain of this valuable and majestic tree, where now it is so flourishing and abundant. Let me be understood. In the boyhood of men fifty years ago, it was a part of children's play to bend down the young pine growth in the woods, to ride upon. They were of that size, as common then, as the larger growth is now, and only of two, three or four years' growth, and about the size of a walking-cane stripped of the bark, and about five, six, or seven feet high. That same generation is now as large as an Alderman's leg: but here is the wonder! *There is none of that age or kind in preparation by Nature, as successors to the present stock in Carolina.* It is rarely that one is to be found; and yet the seed, (or mast as it is called,) is as abundant as ever, and vegetates as thickly as it ever did; but it soon disappears. After it is the size of wheat in November, little more of it is ever seen. The impression of those who have most closely noticed these facts personally is, that the *present generation of pine will be the last that will be seen in North Carolina, perhaps forever.*

In the hope of being enabled soon to give a full account of this extraordinary breach of industry, which opened upon me in the midst of a dense, dreary forest, suffice it now to say, that in the language of the country, one hand is capable of attending to a "*crop*" of so many "*boxes*;" and many of them collect from 150 to 200 barrels of turpentine, worth, last autumn, upward of $3 a barrel. It was said that one man, with his three hands, allowing them a small portion of the proceeds, had realized upward of $4,000. The turpentine is either shipped from Wilmington, where vessels are lying to take it to northern ports, or is distilled into spirits of Turpentine, on the spot; and this has been found so profitable that there are already 40 distilleries in operation in Wilmington and along the river. I need not tell you that these are the fruits of Yankee penetration—for you remember where Bonaparte said their enterprise would carry them for a bag of coffee. The wonder strikes the most superficial into the industrial pursuits of the country under his view, how it is that a branch of business so exceedingly profitable should not be entered upon by those who inhabit a line of 400 miles of continuous long-leaf pine growth from Savannah, Georgia, to Chehaw in Alabama! I may trouble your readers on some early occasion with some reflections on this problem, as well as with some of the statistics, agricultural and commercial, of the tar and turpentine industry of North Carolina.

Well! how shall I *sum up* the observations that a traveler is likely to make, on the great thoroughfare of —— miles between Washington and Wilmington? Every one knows, or ought to know, that from the necessity of the case, the main lines of travel through a new country must traverse the ridges or back bones of particular sections, avoiding impassable water courses and the rich alluvial lands that border them. Thus we are not surprised at sparse settlements and slender products. But what most interests the philosophical observer is, the *spirit and character of the people*, as indicated by the appearance of the *settled* parts of the country? How look the dwellings—not whether large or small, but has any taste been displayed in their Architecture? Have any native shade-trees been left standing, or have any been planted and *kept in order?* Has provision been made for a succession of good vegetables in a well enclosed garden? Is there a piazza before the mansion, however rude and humble, and has the housewife been encouraged and provided with means to train over it the vine, and the yellow jasmine, and the multiflora, and the honeysuckle? And then the field cultivation—no matter how small the scale of it, but is the tillage perfect? Does the plow run close to the road and the fence sides? Have the harrow and the roller, and, yet more, the *drag-log*, done their office in the way of pulverization? But first, and above all, have his fields—no matter, again, how small—but have they, as far as in cultivation, been *well and thoroughly drained* of all superficial and surplus moisture, every drop? *for not a drop should stagnate in or upon it.* In a word, does the farm or plantation under view, proclaim to the passing observer, that the owner's mind is itself a *cultivated field?*—one which by education and reading has been imbued with a salutary thirst for knowledge; one which a laudable

pride has inspired with ambition to have it said that he excels in what he *does* undertake? In a word, is there an air of neatness and cleanliness about his homestead, and exact and perfect culture in his field to show that thought has drained his own mind of sloth and ignorance, and reading and reflection on the why and the wherefore of everything that is done, let in upon his soul the light of agricultural discovery and the genial warmth of virtuous and useful knowledge, in which, after all, is the only true glory to be found? *or*, does the absence of all these features in the aspect of the country, betray, along the line in question, the presence of a population too much given up to indolence of mind and body, and the party purposes of party hacks—consuming time, the most precious of all things, in the vain retrospect o better times, or the debasing pursuit of petty offices, without education, or the moral courage which proper education only can give, to look existing difficulties in the face, and at once set about the work of reform, or abandon at once, fields of profitless labor, that no degrees of knowledge and industry can reclaim and fructify? Trying the country which falls under the eye of the stranger on his way from Aquia Creek to Wilmington, N. C. by these tests, and the painful conviction strikes you that there is *some spell* resting upon it. Try it by the census as the measure of national progress, and that conclusion is but too well confirmed. On one farm there were signs of an enterprising owner: the fences were in order and a great quantity of barn-yard manure had been made and hauled out for the ensuing crop; and some miles, again, before you get to Richmond, on the larboard hand, there is a farm in nice order: the plowing had been early and well done; the soil was well pulverized and the water-furrows were skillfully and well opened to drain the land. Some passenger said it belonged to a Mr. LYON, and I could not help wishing that *such* Lions could be found standing in the path of young agriculturists, here and there, throughout the country. Approaching Petersburg, again, on the same side of the railroad, you find an oasis in the desert, in the handsome residence of a Mr. DUNLOP, a Scotch gentleman "of that ilk." A plantation of beautiful shade-trees ornament an expansive lawn around his mansion, and a handsome graveled pathway conducts to a neat spring-house, which you may easily fancy is well stored with rich milk and nice butter for breakfast, to be enjoyed in the shade of his ample piazzas at this season. I would hazard any thing at a venture that both these gentlemen are readers of Bott's *Southern Planter*.

VIATOR.

P. S.—Observe, I have not been speaking of farms off the road—such as Mr. Wellford's, near Fredericksburg, or the great corn plantations of the Taylors, or the Tayloes, on the Rappahannock, or the wheat farms such as Hill Carter's and Bowling's, on the James River, where intellect of a high order combines humanity with strict discipline, and gives to labor and capital their most skillful direction. Of these I have seen a little and heard the most honorable reports, and hope to be able to speak more at large, some day, on personal observation.

CASK MAKING BY MACHINERY.

Considerable sums of money have at various times been expended in trying to bring to perfection machinery for making casks, but heretofore this object has been unattained, some parts always having to be finished by manual labor. A very ingeniously constructed machine (which we have had an opportunity of inspecting) has at last, however, been constructed by Mr. W. Wild, of Bedford-street, Broughton-road. The lags or staves, hoops, and heads, are, in the first instance, dressed off by other machinery, which is being constructed for the purpose; afterward the finishing machine is fed with the previously prepared heads, hoops, and staves, and will in two minutes' time turn out a complete barrel, vastly superior in workmanship to what has hitherto been effected by manual labor. Old barrels can also as easily be repaired by the same machine, the only difference in time being occupied in the taking to pieces of the old barrels previously to substituting such fresh staves, heads, or hoops, as may be required previously to feeding the machine. The barrels, when completed, are vastly superior to any heretofore turned out by manual labor, the machine fitting each stave as close as though the whole barrel had been formed of one piece of timber—thus doing away with the necessity, when made by hand, of filling up any defects with rushes; which plan, it is well known, has the effect of rendering casks very foul, unless extraordinary care be taken, and consequently much time is occupied in thoroughly cleansing them.

[Manchester (Eng.) Courier.

Would not this inventor find a great field for his machine in the rice region of the U. States, where so many casks are needed—where timber is so cheap, and labor so dear? A rice cask holds about 9 or 10 bushels; and the "*task*" for a man, with the staves and hoops at hand, is to set up three in a day. [*Ed. Farm. Lib.*

TO EXTERMINATE BEETLES.—Place a few lumps of unslaked lime where they frequent; or set a dish or trap, containing a little beer or syrup, at the bottom, and place a few sticks slanting against its sides, so as to form a sort of gangway for the beetles to climb up by, when they will go headlong into the bait set for them. Another plan: mix equal weights of red lead, sugar, and flour, and place it nightly near their haunts. This last mixture made into sheets, forms the beetle-wafers, sold at the oil shops.

[Cooley's Cyclo. of Practical Receipts.

LIN[illegible]ONG THE LEAVES.

BY ELIZA COOK.

HAVE ye heard the w[illegible]st wind singing, where the summer trees are springing?
Have ye counted o'er the many tunes it knows?
For the wide-winged spirit rangeth, and its ballad metre changeth
As it goes.

A plaintive wail it maketh when the willow's tress it shaketh,
Like new-born infant sighing in its sleep;
And the branches, low and slender, bend to list the strain so tender,
Till they weep.

Another tale 't is telling, where the clustered elm is swelling
With dancing joy, that seems to laugh outright;
And the leaves, all bright and clapping, sound like human fingers snapping
With delight.

The fitful key-note shifteth where the heavy oak uplifteth
A diadem of acorns broad and high;
And it chants with muffled roaring, like an eagle's wings in soaring
To the sky.

Now the breeze is freshly wending, where the gloomy yew is bending,
To shade green graves and canopy the owl;
And it gives a mournful whistle, that remindeth of the missal
And the cowl.

Another lay it giveth where the spiral poplar liveth,
Above the cresses, lily, flag, and rush;
And it sings with hissing treble like the foam upon the pebble
In its gush.

A varied theme it utters where the glossy date-leaf flutters—
A loud and lightsome chant it yieldeth there;
And the quiet, listening dreamer may believe that many a streamer
Flaps the air.

It is sad and dreary hearing where the giant pine is rearing
A lonely head, like hearse plume waved about;
And it lurketh melancholy where the thick and sombre holly
Bristles out.

It murmurs soft and mellow mid the light laburnums yellow,
As lover's ditty chimed by rippling plash,
And deeper is its tiding, as it hurries, swiftly gliding
Through the ash.

A roundelay of pleasure does it keep in merry measure,
While rustling in the rich leaves of the beech,
As though a band of fairies were engaged in Mab's vagaries,
Out of reach

Oh! a bard of many breathings is the Wind in sylvan wreathings,
O'er mountain tops and through the woodland groves,
Now fifing and now drumming—now howling and now humming,
As it roves.

Oh! are not human bosoms like these things of leaves and blossoms,
Where hallowed whispers come to cheer and rouse?
Is there no mystic stirring in our hearts, like sweet wind whirring
In the boughs?

Though that wind a strange tone waketh in every home it maketh,
And the maple tree responds not as the larch,
Yet Harmony is playing round all the green arms swaying
'Neath Heaven's arch.

Oh! what can be the teaching of these forest voices preaching?
'T is that a brother's creed, though not as mine,
May blend about God's altar, and help to fill the psalter
That 's divine.

AN INTERESTING CHAPTER FOR FARMERS.

[From Dr. Lardner's Lectures.*]

SUPPOSED EFFECT OF THE MOON ON TERRESTRIAL OBJECTS.

The Red Moon—Supposed effect of the Moon on the Movement of Sap in Plants—Prejudice respecting the time for felling Timber—Extent of this Prejudice—Its Prevalence among Transatlantic People—Prejudices respecting Effects on Grain—On Wine—On the Complexion—On Putrefaction—On Wounds—On the Size of Oysters and Shell-fish—On the Marrow of Animals—On the Weight of the Human Body—On the Time of Births—On the Hatching of Eggs—On Human Maladies—On Insanity—On Fevers—On Epidemics—Case of Vallisnieri—Case of Bacon—On Cutaneous Diseases, Convulsions, Paralysis, Epilepsy, &c.—Observations of Dr. Olbers.

On a former occasion I examined the question respecting the supposed influence of the moon upon the weather, and demonstrated that so far as actual observation has hitherto afforded grounds for reasoning, there is no discoverable correspondence between the lunar changes and the vicissitudes of rain and drouth which can justify or in any degree countenance the popular belief so generally entertained as to dependence of change of weather upon the changes of the moon.

But meteorological phenomena are not the only effects imputed to our satellite; that body, like comets, is made responsible for a vast variety of interferences with organized nature. The circulation of the juices of vegetables, the qualities of grain, the fate of the vintage, are all laid to its account; and timber must be felled, the harvest cut down and gathered in, and the juice of the grape expressed, at times and under circumstances regulated by the aspects of the moon, if excellence be hoped for in these products of the soil.

According to popular belief, our satellite also presides over human maladies; and the phenomena of the sick chamber are governed by the lunar phases; nay, the very marrow of our bones, and the weight of our bodies, suffer increase or diminution by its influence Nor is its imputed power confined to physical or organic effects; it notoriously governs mental derangement.

If these opinions respecting lunar influence were limited to particular countries, they would be less entitled to serious consideration; but it is a curious fact that many of them prevail and have prevailed in quarters of the earth so distant and unconnected that it is difficult to imagine the same error to have proceeded from the same source. At all events, the extent of their prevalence alone renders them a fit subject for serious investigation; and I propose at present to lay before you some of the principal facts and arguments bearing on these points, for the collection of which we are mainly indebted to the industry and research of M. Arago.

A large volume would be necessary to analyze all the popular opinions which refer to the supposed lunar influences. We shall confine ourselves, therefore, to the principal of them, and shortly examine how far they can be reconciled with the established principles of Astronomy and Physics.

The Red Moon.—It is believed, generally, especially in the neighborhood of Paris, that in certain months of the year, the moon exerts a great influence upon the phenomena of vegetation. Gardeners give the name of *Red Moon* to that moon which is full between the middle of April and the close of May. According to them, the light of the moon at that season exercises an injurious influence upon the young shoots of plants. They say that when the sky is clear the leaves and buds exposed to the lunar light redden and are killed as if by frost, at a time when the thermometer exposed to the atmosphere stands at many degrees above the freezing point. They say also that if a clouded sky intercepts the moon's light it prevents these injurious consequences to the plants, although the circumstances of temperature are the same in both cases.

Any person who is acquainted with the beautiful theory of dew, which we owe to Dr. Wells, will find no difficulty in accounting for these effects erroneously imputed to the moon. If the heavens be clear and unclouded, all substances on the surface of the earth which are strong and powerful radiators of heat, lose temperature by radiation, while the unclouded sky returns no heat to them to restore what they have lost. Such bodies, therefore, under these circumstances, become colder than the surrounding air, and may even, if they be liquid, be frozen. Ice, in fact, is produced, in warm climates, by similar means. But if the firmament be enveloped in clouds, the clouds have the quality of radiating heat, will restore by their radiation, to substances upon the surface of the earth, as much heat as such substances lose by radiation; the temperature, therefore, of such bodies will be maintained at a point equal to that of the air surrounding them.

Now the leaves and flowers of plants are strong and powerful radiators of heat; when the sky is clear they therefore lose temperature and may be frozen; if, on the other hand, the sky be

* Popular Lectures on Science and Art, delivered in the principal Cities and Towns of the United States, by Dionysius Lardner, Doctor of Civil Law, Fellow of the Royal Society of London and Edinburgh, formerly Professor of Astronomy and Natural Philosophy in the University of London. 2 vols. octavo, with numerous Engravings. New-York: Greeley & McElrath.

clouded, their temperature is maintained for the reasons above stated.

The moon, therefore, has no connection whatever with this effect; and it is certain that plants would suffer under the same circumstances, whether the moon is above or below the horizon. It equally is quite true that if the moon be above the horizon, the plants cannot suffer unless it be visible; because a *clear sky* is indispensable as much to the production of the injury to the plants as to the visibility of the moon; and, on the other hand, the same clouds which veil the moon and intercept her light give back to the plants that warmth which prevents the injury here adverted to. The popular opinion is therefore right as to the *effect*, but wrong as to the *cause*; and its error will be at once discovered by showing that on a clear night, when the moon is new, and, therefore, not visible, the plants may nevertheless suffer.

Time for felling Timber.—There is an opinion generally entertained that timber should be felled only during the decline of the moon; for if it be cut down during its increase, it will not be of a good or durable quality. This impression prevails in various countries. It is acted upon in England, and is made the ground of legislation in France. The forest laws of the latter country interdict the cutting of timber during the increase of the moon. M. Auguste de Saint Hilaire states that he found the same opinion prevalent in Brazil. Signor Francisco Pinto, an eminent agriculturist in the province of Espirito Santo, assured him as the result of his experience, that the wood which was not felled at the full of the moon was immediately attacked by worms and very soon rotted.

In the extensive forests of Germany, the same opinion is entertained and acted upon with the most undoubting confidence in its truth. Sauer, a superintendent of some of these districts, assigns what he believes to be its physical cause. According to him the increase of the moon causes the sap to ascend in the timber; and, on the other hand, the decrease of the moon causes its descent. If the timber, therefore, be cut during the decrease of the moon it will be cut in a dry state, the sap having retired; and the wood, therefore, will be compact, solid and durable. But if it be cut during the increase of the moon, it will be felled with the sap in it, and will therefore be more spongy, more easily attacked by worms, more difficult to season, and more readily split and warped by changes of temperature.

Admitting for a moment the reality of this supposition concerning the motion of the sap, it would follow that the proper time for felling the timber would be the new moon, that being the epoch at which the descent of the sap would have been made, and the ascent not yet commenced. But can there be imagined in the whole range of natural science, a physical relation more extraordinary and unaccountable than this supposed correspondence between the movement of the sap and the phases of the moon? Assuredly theory affords not the slightest countenance to such a supposition; but let us inquire as to the fact whether it be really the case that the quality of the timber depends upon the state of the moon at the time it is felled.

M. Duhamel Monceau, a celebrated French agriculturist, has made direct and positive experiments for the purpose of testing this question; and has clearly and conclusively shown that the qualities of timber felled in different parts of the lunar month are the same. M. Duhamel felled a great many trees of the same age, growing from the same soil, and exposed to the same aspect, and never found any difference in the quality of the timber when he compared those which were felled in the decline of the moon with those which were felled during its increase; in general they have afforded timber of the same quality. He adds, however, that by a circumstance which was doubtless fortuitous, a slight difference was manifested in favor of timber which had been felled between the new and full moon—contrary to popular opinion.

Supposed Lunar Influence on Vegetables.—It is an aphorism received by all gardeners and agriculturists in Europe, that vegetables, plants and trees, which are expected to flourish and grow with vigor, should be planted, grafted, and pruned, during the increase of the moon. This opinion is altogether erroneous. The increase or decrease of the moon has no appreciable influence on the phenomena of vegetation; and the experiments and observations of several French agriculturists, and especially of M. Duhamel du Monceau (already alluded to) have clearly established this.

Montanari has attempted, like M. Sauer, to assign the physical cause for this imaginary effect. During the day, he says, the solar heat augments the quantity of sap which circulates in plants by increasing the magnitude of the tube through which the sap moves; while the cold of the night produces the opposite effect by contracting these tubes. Now, at the moment of sunset, if the moon be increasing, it will be above the horizon, and the warmth of its light would prolong the circulation of the sap; but, during its decline, it will not rise for a considerable time after sunset, and the plants will be suddenly exposed to the unmitigated cold of the night, by which a sudden contraction of leaves and tubes will be produced, and the circulation of the sap as suddenly obstructed.

If we admit the lunar rays to possess any sensible calorific power, this reasoning might be allowed; but it will have very little force when it is considered that the extreme change of temperature which can be produced by the lunar light, does not amount to the thousandth part of a degree of the thermometer.

It is a curious circumstance that this erroneous prejudice prevails on the American continent. M. Auguste de Saint Hilaire states that, in Brazil, cultivators plant during the decline of the moon all vegetables whose roots are used as food; and, on the contrary, they plant during the increasing moon the sugar-cane, maize, rice, beans, &c. and those which bear the food upon their stocks and branches. Experiments, however, were made and reported by M. de Chauvalon, at Martinique, on vegetables of both kinds planted at different times in the lunar month, and no appreciable difference in their qualities was discovered.

There are some traces of a principle in the rule adopted by the South American agronomes, according to which they treat the two classes of plants, distinguished by the production of fruit on their roots or on their branches, differently; but there are none in the European aphorisms. The directions of Pliny are still more specific: he prescribes the time of the full moon for sowing beans, and that of the new moon for lentils. "Truly," says M. Arago, "we have need of a robust faith to admit, without proof, that the moon, at the distance of 240,000 miles, shall in

one position act advantageously upon the vegetation of beans, and that in the opposite position, and at the same distance, she shall be propitious to lentils."

Supposed Lunar Influence on Grain.—Pliny states that, if we would collect grain for the purpose of immediate sale, we should do so at the full of the moon; because, during the moon's increase, the grain augments remarkably in magnitude; but if we would collect the grain to preserve it, we should choose the new moon, or the decline of the moon.

So far as it is consistent with observation that more rain falls during the increase of the moon than during its decline, there may be some reason for this maxim; but Pliny, or those from whom we receive the maxim, can barely have credit for grounds so rational: besides which, the difference in the quantity of rain which falls during the two periods is too insignificant to produce the effects here adverted to.

Supposed Lunar Influence on Wine-making. It is a maxim of wine-growers that wine which has been made in two moons is never of a good quality, and cannot be clear. Toaldo, the celebrated Italian meteorologist, whose mind appears to have been predisposed for the reception of lunar prejudice, attempts to justify this maxim. "The vinous fermentation," he says, "can only be carried on in two moons when it begins immediately before the new moon; and, consequently, that this being a time when the enlightened side of the moon is turned for the most part from the earth, our atmosphere is deprived of the heat of the lunar rays; that, therefore, the temperature of the air is lowered, and the fermentation is less active.

To this we need only answer that the moon's rays do not affect the temperature of the air to the extent of one-thousandth part of a degree of the thermometer, and that the difference of temperatures of any two neighboring places in which the process of making the wine of the same soil and vintage might be conducted must be a thousand times greater at any given moment of time; and yet no one ever imagines that such a circumstance can affect the quality of the wine.

It is a maxim of Italian wine merchants that wine ought never to be transferred from one vessel to another in the months of January or March, unless in the decline of the moon, under penalty of seeing it spoiled.

Toaldo has not favored us with any physical reason for this maxim; but it is remarkable that Pliny, on the authority of Hyginus, recommends precisely the opposite course. We may presume that, from such contrary rules, it may reasonably be inferred that the moon has no influence whatever in this case.

Among the maxims of Pliny we find that grapes should be dried by night at new moon, and by day at full moon.

When the moon is new it is below the horizon during the night, and above it during the day; and when it is full it is above the horizon during the night, and below it during the day. The maxim of Pliny, therefore, is equivalent to a condition requiring that the grapes should be dried when the moon is below the horizon. It is evident that the absence of the moon is not required in this case in consequence of any effect which her light might produce if she were present; for when the moon is new she affords no light, even when in the firmament—the illuminated side being turned from the earth. If the maxim be founded upon any reason, it must, therefore, either be on some influence which the moon is supposed to produce when present, independent of her light (the absence of which influence is desired); or it may be that she may be supposed to transmit some effect through the solid mass of the earth, when on the other side of it, which she is incapable of producing without its intervention. The maxim is probably as absurd and groundless as the other effects imputed to the moon.

Supposed Lunar Influence on the Complexion.—It is a prevalent popular notion, in some parts of Europe, that the moon's light is attended with the effect of darkening the complexion.

That light has an effect upon the color of material substances is a fact well known in physics and in the arts. The process of bleaching by exposure to the sun is an obvious example of this class of facts. Vegetables and flowers which grow in a situation excluded from the light of the sun are different in color from those which have been exposed to its influence. The most striking instance, however, of the effect of certain rays of solar light in blackening a light-colored substance, is afforded by chloride of silver, which is a white substance, but which immediately becomes black when acted upon by the rays near the red extremity of the spectrum. This substance, however, highly susceptible as it is of having its color affected by light, is, nevertheless, found not to be changed in any sensible degree when exposed to the light of the moon, even when that light is condensed by the most powerful burning lenses. It would seem, therefore, that, as far as any analogy can be derived from the qualities of this substance, the popular impression of the influence of the moon's rays in blackening the skin receives no support.

M. Arago (who generally inclines to favor rather than oppose prevailing popular opinions) appears to think it possible that some effect may be produced upon the skin exposed on clear nights, explicable on the same principle as that by which we have explained the effects erroneously imputed to what is called the *red moon.*—The skin being, in common with the leaves and flowers of vegetables, a good radiator of heat, will, when exposed on a clear night, for the same reasons, sustain a loss of temperature.—Although this will be to a certain extent restored by the sources of animal heat, still it may be contended that the cooling produced by radiation is not altogether without effect. It is well known that a person who sleeps exposed in the open air, on a night when the dew falls, is liable to suffer from severe cold, although the atmosphere around him never falls below a moderate temperature, and although no actual deposition of dew may take place upon his skin. This effect must arise from the constant lowering of temperature of the skin by radiation. In military campaigns the effects of bivouacing at night appear to be generally admitted to darken the complexion.*

There is a proverb which is used in certain parts of France as a warning against night promenades:

> "Que lou sol y la sereine
> Fau gerie la gent Mouraine."

* Le hâle de bivouac is an effect quite recognized. Hâle is a term which expresses a state of the air which makes an impression upon the complexion, rendering it tanned and burnt.

It is remarkable that this proverb is current in places where the red moon is not noticed.

Supposed Lunar Influence on Putrefaction.—Pliny and Plutarch have transmitted it as a maxim, that the light of the moon facilitates the putrefaction of animal substances, and covers them with moisture. The same opinion prevails in the West Indies, and in South America. An impression is prevalent, also, that certain kinds of fruit exposed to moonlight lose their flavor and become soft and flabby; and that if a wounded mule be exposed to the light of the moon during the night, the wound will become irritated, and frequently become incurable.

Such effects, if real, may be explained upon the same principles as those by which we have already explained the effects imputed to the red moon. Animal substances exposed to a clear sky at night, are liable to receive a deposition of dew, which humidity has a tendency to accelerate putrefaction. But this effect will be produced if the sky be clear, whether the moon be above the horizon or not. The moon, therefore, in this case, is a witness and not an agent; and we must acquit her of the misdeeds imputed to her.

Supposed Lunar Influence on Shell-fish.—It is a very ancient remark, that oysters and other shell-fish become larger during the increase than during the decline of the moon. This maxim is mentioned by the poet Lucilius, by Aulus Gellius and others; and the members of the Academy *del Cimento* appear to have tacitly admitted it, since they endeavor to give an explanation of it. The fact, however, has been carefully examined by Rohault, who has compared shell-fish taken at all periods of the lunar month, and found that they exhibit no difference of quality.

Supposed Lunar Influence on the Marrow of Animals.—An opinion is prevalent among butchers that the marrow found in the bones of animals varies in quantity according to the phase of the moon in which they are slaughtered. This question has also been examined by Rohault, who made a series of observations which were continued for twenty years with a view to test it; and the result was that it was proved completely destitute of foundation.

Supposed Lunar Influence on the Weight of the Human Body.—Sanctorius, whose name is celebrated in physics for the invention of the thermometer. held it as a principle that a healthy man gained two pounds weight at the beginning of every lunar month, which he lost toward its completion. This opinion appears to be founded on experiments made upon himself; and affords another instance of a fortuitous coincidence hastily generalized. The error would have been corrected if he had continued his observations a sufficient length of time.

Supposed Lunar Influence on Births.—It is a prevalent opinion that births occur more frequently in the decline of the moon than in her increase. This opinion has been tested by comparing the number of births with the periods of the lunar phases; but the attention directed to statistics as well in this country as abroad, will soon lead to the decision of this question.*

Supposed Lunar Influence on Incubation.—It is a maxim handed down by Pliny, that eggs should be put to cover when the moon is new. In France it is a maxim generally adopted, that the fowls are better and more successfully reared when they break the shell at the full of the moon. The experiments and observations of M. Girou de Buzareingues have given countenance to this opinion. But such observations require to be multiplied before the maxim can be considered as established. M. Girou inclines to the opinion that during the dark nights about new moon the hens sit so undisturbed that they either kill their young or check their development by too much heat; while in moonlight nights, being more restless, this effect is not produced.

Supposed Lunar Influence on Mental derangement and other Human Maladies.—The influence on the phenomena of human maladies imputed to the moon is very ancient. Hippocrates had so strong a faith in the influence of celestial objects on animated beings, that he expressly recommends no physician to be trusted who is ignorant of astronomy. Galen, following Hippocrates, maintained the same opinion, especially of the influence of the moon. Hence in diseases the lunar periods were said to correspond with the succession of the sufferings of the patients. The critical days or *crises* (as they were afterward called), were the seventh, fourteenth, and twenty-first of the disease, corresponding to the intervals between the moon's principal phases. While the doctrine of alchemists prevailed, the human body was considered as a microcosm; the heart representing the sun, the brain the moon. The planets had each its proper influence: Jupiter presided over the lungs, Mars over the liver, Saturn over the spleen, Venus over the kidneys, and Mercury over the organs of generation. Of these grotesque notions there is now no relic, except the term *lunacy*, which still designates unsoundness of mind. But even this term may be in some degree be said to be banished from the terminology of medicine, and it has taken refuge in that receptacle of all antiquated absurdities of phraseology—the law. Lunatic, we believe, is still the term for the subject who is incapable of managing his own affairs.

Although the ancient faith in the connection between the phases of the moon and the phenomena of insanity appears in a great degree to be abandoned, yet it is not altogether without its votaries; nor have we been able to ascertain that any series of observations conducted on scientific principles, has ever been made on the phenomena of insanity, with a view to disprove this connection. We have even met with intelligent and well-educated physicians who still maintain that the paroxysms of insane patients are more violent when the moon is full than at other times.

Mathiolus Faber gives an instance of a maniac who at the very moment of an eclipse of the moon, became furious, seized upon a sword, and fell upon every one around him. Ramazzini relates that, in the epidemic fever which spread over Italy in the year 1693, patients died in an unusual number on the 21st of January, at the moment of a lunar eclipse.

Without disputing this fact (to ascertain which however, it would be necessary to have statistical returns of the daily deaths), it may be objected that the patients who thus died in such numbers at the moment of the eclipse, might have had their imaginations highly excited, and their fears wrought upon by the approach of that event, if popular opinion invested it with danger. That such an impression was not unlikely to prevail

* Other sexual phenomena, such as the period of gestation, vulgarly supposed to have some relation to the lunar month, have no relation whatever to that period.

is evident from the facts which have been recorded.

At no very distant period from that time, in August, 1654, it is related that patients in considerable numbers were by order of the physicians shut up in chambers well closed, warmed, and perfumed, with a view to escape the injurious influence of the solar eclipse, which happened at that time; and such was the consternation of persons of all classes, that the numbers who flocked to confession were so great that the ecclesiastics found it impossible to administer that rite. An amusing anecdote is related of a village curate near Paris, who, with a view to ease the minds of his flock, and to gain to the necessary time to get through his business, seriously assured them that the eclipse was postponed for a fortnight.

Two of the most remarkable examples recorded of the supposed influence of the moon on the human body, are those of Vallisnieri and Bacon. Vallisnieri declares that being at Padua recovering from a tedious illness, he suffered on the 12th of May, 1706, during the eclipse of the sun, unusual weakness and shivering. Lunar eclipses never happened without making Bacon faint; and he did not recover his senses till the moon recovered her light.

That these two striking examples should be admitted in proof of the existence of lunar influence, it would be necessary, says M. Arago, to establish the fact that feebleness and pusillanimity of character are never connected with high qualities of mind.

Menuret considered that cutaneous maladies had a manifest connection with the lunar phases. He says that he himself observed in the year 1760, a patient afflicted with a scald-head (*teigne*), who, during the decline of the moon, suffered from a gradual increase of the malady, which continued until the epoch of the new moon, when it had covered the face and breast, and produced insufferable itching. As the moon increased, these symptoms disappeared by degrees; the face became free from the eruption; but the same effects were reproduced after the full of the moon. These periods of the disease continued for three months.

Menuret also stated that he witnessed a similar correspondence between the lunar phases and the distemper of the itch: but the circumstances were the reverse of those in the former case; the malady obtaining its maximum at the full of the moon, and its minimum at the new moon.

Without disputing the accuracy of these statements, or throwing any suspicion on the good faith of the physician who has made them, we may observe that such facts prove nothing except the fortuitous coincidence. If the relation of cause and effect had existed between the lunar phases and the phenomena of these distempers, the same cause would have continued to produce the same effect in like circumstances; and we should not be left to depend for the proof of lunar influence on the statements of isolated cases, occurring under the observation of a physician who was himself a believer.

Maurice Hoffman relates a case which came under his own practice, of a young woman, the daughter of an epileptic patient. The abdomen of this girl became inflated every month as the moon increased, and regularly resumed its natural form with the decline of the moon.

Now if this statement of Hoffman were accompanied by all the necessary details, and if, also, we are assured that this strange effect continued to be produced for any considerable length of time, the relation of cause and effect between the phases of the moon and the malady of the girl could not legitimately be denied; but receiving the statement in so vague a form, and not being assured that the effect continued to be produced beyond a few months, the legitimate conclusion at which we must arrive is, that this is another example of fortuitous coincidence, and may be classed with the fulfilment of dreams, prodigies, &c., &c.

As may naturally be expected, nervous diseases are those which have presented the most frequent indications of a relation with the lunar phases. The celebrated Mead was a strong believer, not only in the lunar influence, but in the influence of all the heavenly bodies on all the human. He cites the case of a child who always went into convulsions at the moment of full moon. Pyson, another believer, cites another case of a paralytic patient whose disease was brought on by the new moon. Menuret records the case of an epileptic patient whose fits returned with the full moon. The transactions of learned societies abound with examples of giddiness, malignant fever, somnambulism, &c., having in their paroxysms more or less corresponded with the lunar phases. Gall states, as a matter having fallen under his own observation, that patients suffering under weakness of intellect, had two periods in the month of peculiar excitement; and in a work published in London so recently as 1829, we are assured that these epochs are between the new and full moon.

Against all these instances of the supposed effect of lunar influence, we have little direct proof to offer. To establish a negative is not easy. Yet it were to be wished that in some of our great asylums for insane patients, a register should be preserved of the exact times of theaccess of all the remarkable paroxysms; a subsequent comparison of this with the age of the moon at the time of their occurrence would furnish the ground for legitimate and safe conclusions. We are not aware of any scientific physician who has expressly directed his attention to this question, except Dr. Olbers of Bremen, celebrated for his discovery of the planets Pallas and Vesta. He states that in the course of a long medical practice, he was never able to discover the slightest trace of any connection between the phenomena of disease and the phases of the moon. In the spirit of true philosophy, M. Arago, nevertheless, recommends caution in deciding against this influence. The nervous system, says he, is in many instances an instrument infinitely more delicate than the most subtle apparatus of modern physics. Who does not know that the olfactory nerves inform us of the presence of odoriferous matter in air, the traces of which the most refined physical analysis would fail to detect? The mechanism of the eye is highly affected by that lunar light which, even condensed with all the power of the largest burning lenses, fails to affect by its heat the most susceptible thermometer, or, by its chemical influence, the chloride of silver; yet a small portion of this light introduced through a pin-hole will be sufficient to produce an instantaneous contraction of the pupil; nevertheless the integuments of this membrane, so sensible to light, appear to be completely inert when otherwise affected. The pupil remains unmoved, whether we scrape it with the point of a needle, moisten

it with liquid acids, or impart to its surface electric sparks. The retina itself, which sympathizes with the pupil, is insensible to the influence of the most active mechanical agents. Phenomena so mysterious should teach us with what reserve we should reason on analogies drawn from experiments made upon inanimate substances, to the far different and more difficult case of organized matter endowed with life.

In conclusion, then, it appears that of all the various influences popularly supposed to be exerted on the surface of the earth, few have any foundation in fact. The precession of the equinoxes, the accumulated effect of which rendered necessary the alteration of the calendar, which produced the distinction between the old and new style, is a consequence of the moon's attraction combined with that of the sun upon the protuberant matter around the equatorial parts of the earth; and the nutation of the earth's axis, and the consequent periodical change of the obliquity of the ecliptic, is an effect due to the same cause. I have on another occasion shown that the tides of the ocean are real effects also arising from the combined attractions of the moon and sun, but chiefly of the former.

The precession of the equinoxes is a progressive annual change in the position of those points on the firmament where the center of the sun crosses the Equator on the 21st of March and the 21st of September. It has been ascertained by observation, and verified by theory, that these points move annually on the ecliptic with a slow motion in a contrary direction to the apparent motion of the sun; in consequence of which the sun, after each revolution of the ecliptic, meets these points *before* that revolution has been completed; consequently the sun's center returns to the same equinoctial point before it makes one complete revolution of the heavens: hence has arisen the distinction between a sidereal year, which is the actual time the earth takes to make a complete revolution round the sun, and an equinoctial or civil year, which is the period between the successive returns of the center of the sun to the same equinoctial point, and is the interval within which the periodical vicissitudes of the seasons are completed.

NEW USES OF IRON ... IRON HARROWS.

In few branches of trade or manufacture is there probably greater latitude for extension than in the field which lies open for new uses of Iron. Every day suggests some new object for which it has not before been employed, and then the wonder is that it was never so employed before.

In Mr. Colman's last "EUROPEAN AGRICULTURE," vol. i. part V. quoting Mr. I. Allen Ransome's treatise on the Implements of Husbandry, he says, on the subject of *Harrows*—"There are several varieties of Harrows, but, excepting the frame being made of iron instead of wood, and their being connected by hinges, so that the frame becomes, so to speak, flexible, I see no prominent excellence to be pointed out,"—and then quotes—"In an experiment made between a pair of wooden harrows and a pair of iron ones, constructed on the same plan, and having the same number and precisely the same disposition of the teeth and frames, although those of iron were found to be twenty pounds lighter than those of wood, yet the former worked decidedly better and steadier than the latter. In fact, the iron harrows cut into the land, while those made of wood rode, or rather danced, upon the surface." We confess we do not well see how this could be. If the wooden frame were *heavier*, why should the teeth not sink as deep? In respect of the *hinges* connecting the harrows and making them flexible, so as to accommodate their action to uneven surfaces, we have long had such harrows. In fact, our implement makers have all the best kinds, we are inclined to think, of that implement. Their own interest and public spirit, we trust, will prompt them to import samples, at least, of whatever is said or supposed to be superior in its kind. Their patrons have a right to judge for themselves; and we presume there will be few machines or implements adapted to our country that may not be seen in factories so immense as Ruggles and Moore's.

A late English paper says:

"The use of iron is still greatly extending in Manchester, where the principles of its application are well understood, and all the casting establishments are in active operation. The most novel application of this material is in the Independent Chapel erecting in Salford, near the Broughton Bridge, from the designs of Mr. Richard Lane. The roof is framed of cast iron principals, curved, and meeting at the top in a Gothic arch. Each half is in two pieces, firmly bolted together, and the principals are connected by tie-rods. The feet of the principals are spread out, and rest on blocks of stone, but are farther supported by iron columns, built into the wall, which stand upon stone corbels at the ground level. There are shoes, cast on the principals, to receive the purlins. There will be a school-room underneath. There are two hights of iron columns, the upper supporting the iron girders for the galleries. These girders are curved in form, so as to approach nearer to the section of the steps of the galleries."

AGRICULTURE IN THE STATE OF NEW-YORK.

Mr. KINNE, from the *Committee on Agriculture* in the New-York Assembly, has made a Report to the Legislature on so much of the Governor's Message as relates to the Farming interest. The Report strongly recommends the *State Agricultural Society* to the favorable notice of the Legislature—believing, as the Committee do, that through the instrumentality of the Society a great improvement has taken place in the practice of husbandry generally, in the breeding of cattle, and in the production of butter and cheese. The Report speaks well of the annual Fairs—of the favorable results of the sales of improved stock—of the Farmers' Clubs, and of the annual volume of the published Transactions of the State Society; but they are opposed to the State founding an Agricultural College or purchasing and sustaining an Experimental Farm. The following remarks we deem applicable to other States as well as New-York:

An abundance of statistical facts might be adduced, showing conclusively that, while the farmer of New-York has been growing rich, the fertility of her soil has been gradually but certainly diminishing. The fertility of a soil is usually measured by its capacity for growing wheat. Taking this as a test, it is but too evident that we have not overrated the fact that the fertility of New-York is diminishing. Wheat is rarely raised in the older Counties of the State, and in the fertile west the annual average per acre is diminishing. Many of the Counties of the State, formerly wheat-growing Counties, have of late years found that barley was a more certain and profitable crop, and they are, consequently, gradually abandoning the culture of wheat.

It is becoming known to the more enlightened agriculturists that the former ruinous practices of husbandry have contributed to the constant and annual removal from the soil of those peculiar elements which are necessary to secure the growth of wheat. To the great mass of our farmers, the doctrines of a well-founded Agricultural Chemistry are neither known nor appreciated. The enlightened statesman, therefore, who is anxiously looking after those causes which affect the prosperity of the commonwealth, must see, in this view of the subject, the absolute necessity of adopting a policy which is prejudicial to no one, and which may be beneficial to all.

There are many practices in use by our farmers that should be improved, if the case is within the reach of possibility. To select one out of many, we will mention that of "summer fallowing" for wheat. Can this practice be abandoned? If it can, the importance of correcting this habit will be evident to every one; for, by abandoning this questionable practice, one entire crop of grain will be saved to the farmer and the community, and, while the farmer's profits are thus increased, the price of bread will be cheapened to the poor laborer.

The community will never come to a right or a sound conclusion upon this subject until the feasibility of this plan is tested by so many contributors to the transactions of your Agricultural Societies, that there will be no reason to doubt the accuracy and the truth of their conclusions, nor until the full knowledge of all the details of the various experiments shall have been had in every hamlet and neighborhood of your entire State.

We might multiply instances that tend to prove that both the art of farming and the farmer will be alike improved by the course pointed out, but we forbear.

The prosperity of the farming community of the State of New-York will ever be an object of the deepest interest to her legislators. There are causes now at work which will sharply affect that prosperity for weal or woe. Should any cause materially depress the price of wool, and thus compel the farmers over a large portion of the State to seek in some other kind of husbandry a remuneration for their labor and capital employed, then will our agricultural interests be depressed below a point which they have not reached in the worst of times. That the wool-grower will have to contend, ere long, with adverse circumstances, is more than probable.—The ease and facility with which wool can be raised on the pampas of Brazil, and upon the prairies of the Western States, will, sooner or later, seriously affect that interest. Should this prediction be verified, adversity will compel the wool-grower of New-York to pay close attention to the breeding of animals which will clip the largest fleeces of the finest wool, and those that can be raised and sustained in the cheapest possible manner.

The Agricultural Society have not been blind to this state of things, and the course they have pursued has contributed most materially to the introduction of valuable breeds of sheep into this State. The Committee hope the Society will continue to encourage, by their wise policy, the exhibition of sheep from other States at their annual Fairs; for it is only by comparing carefully these animals, when placed side by side, that perfectly correct conclusions can be arrived at. The State of New-York has a deep interest in the thorough investigation of this subject.

A large portion of our State is yet in its native forest, nor can we reasonably hope that these waste lands will soon come under cultivation unless they are required for grazing. The butter and cheese dairies of the State are at present receiving fair encouragement. It is not probable that their prosperity will be soon or seriously affected. Should they receive from any cause, either foreign or domestic, a farther stimulus, its tendency will be to bring more of the wilderness of New-York into successful cultivation—a result most heartily to be desired. We

can see no possible means by which to hasten such an event, except by using the requisite means for diffusing a true knowledge of those principles, whether chemical or agricultural, upon which the dairyman's success depends.—No doubt whatever exists that the consumption of the articles of butter and cheese will be materially increased if the quality can be improved. Your Committee are prepared to believe that the butter and cheese dairies are in a state of rapid improvement. They infer this from the fact that, at the commencement of the Agricultural Societies, eminent dairymen were willing to compete for premiums, but were not willing to comply with the terms of the Society, by furnishing a full and detailed statement of the mode of operation, for fear of divulging the secret of their success. This illiberal prejudice is fast wearing away, and the beneficial effects resulting from the publications of the Society is being materially felt.

During the last year a Census has been taken, in which are embodied valuable details respecting the crops of this State. Your Committee forbear quoting from these statistics, as the whole is in course of publication. But your Committee are grieved to find that some of the crops returned, fall much short of the yield per acre from what might have been reasonably expected.—One of these—Wheat—has long been a staple of the State, and the falling off of this crop, in a large number of the older and more populous Counties of the State, is a serious public calamity; not only because it diminishes the profits of the farmer, but because it drains these Counties of a large amount of specie to furnish these breadstuffs, which are indispensable for their subsistence and comfort.

This calamity is owing in a great measure to the ravages of the Wheat-Fly; an evil which does not seem to abate, and for which there seems to be no certain cure. Although the evil cannot be eradicated, the Committee believe that in the papers of the Society, will be found a detail of a method of culture which will measurably alleviate, if not entirely avoid, the ravages of the weevil.

In common with several European countries, this State has been visited with a disease which has seriously affected both the yield and quality of the poor man's esculent—the Potato. The average yield of this valuable root ought to be nearly if not quite two hundred bushels per acre, throughout the entire State, and yet from the Census returns, it does not amount to more than ninety. This calamity early arrested the attention of the State Society, and they are ready to believe that the communications which they are about to publish will have a decided and beneficial effect upon the culture of this inestimable root. Unless this is the fact, and the disease goes on increasing in intensity and malignity, the most serious consequences will ultimately be realized. Already a less quantity of land is planted with potatoes by the farmer. Thus the amount of the crop is diminished, and if it is still farther diminished by disease, the poor will severely suffer.

It is a singular fact that the restrictive policy which has closed the ports of England against the world, was commenced in the reign of Elizabeth—during whose reign the potato was first introduced into Europe—and that owing to the lamentable failure of this national root crop, this restrictive policy is about to be abandoned.—Strange that so humble an agricultural production should have such momentous influence upon the destinies of great nations!

In connection with this subject, your Committee would remark, that the American farmer must have his attention drawn to the use of salt as manure in in an especial manner. Salt has not been used for this purpose to any very great extent, as your Committee learn. Yet it has been satisfactorily proven by numerous experiments in the County of Onondaga and elsewhere, that the free use of salt has very much added to the yield of the land.

This is an important fact; yet there is something connected with the use of salt as manure of almost equal importance; that is, the unparalleled agency of salt in destroying insects of almost every kind. No farmer should neglect to use salt as a manure upon all those fields liable to the pestiferous ravages of the grub, wire-worm and caterpillar. In gardens it is invaluable, especially in those which have long been worked and are very rich. The disease of the potato, before mentioned, whatever may be its cause, is found to yield its virulence to the agency of salt, and no potato crop should be planted without salt being used, in whole or in part, as a manure.

There is also good reason for believing that where salt is used for manure, the disease of the Wheat crop, known by the name of rust, which more or less every year affects it injuriously, will be measurably abated if not wholly averted. At all events, it is well established, that in one particular district of England, where old brine has long been used as a manure, rust rarely if ever makes its appearance. It is true that there is a wide difference between the cold, damp climate of England, and the hot and dry climate of New-York. Still the subject deserves the especial attention of the New-York farmer.

To take the Honey without destroying the Bees.—In the dusk of the evening, when the bees are quietly lodged, approach the hive, and turn it gently over. Having steadily placed it in a small pit, previously dug to receive it, with its bottom upward, cover it with a clean new hive, which has been properly prepared, with a few sticks across the inside of it, and rubbed with aromatic herbs. Having carefully adjusted the mouth of each hive to the other, so that no aperture remains between them, take a small stick, and beat gently round the sides of the lower hive for about ten inches or a quarter of an hour, in which time the bees will leave their cells in the lower hive, ascend, and adhere to the upper one. Then gently lift the new hive, with all its little tenants, and place it on the stand from which the other hive was taken. This should be done some time in the week preceding Midsummer-day, that the bees may have time, before the summer flowers have faded, to lay in a new stock of honey, which they will not fail to do, for their subsistence through winter.

[Cooley's Cyclo. of Prac. Receipts.

Apple Sugar.—Express the juice, and add chalk until the whole of the acid is saturated; pour off the clear liquor; then clarify by boiling in a clean pan with some white of egg; skim off the dirt; and lastly evaporate by a gentle heat to a proper consistence. *Remarks.* 1 cwt. of apples yield about 84 lbs. of juice and 12 lbs. of crude sugar. [Cooley's Cyclo. of Prac. Rec.

From the New-York Albion.

DIRECTIONS FOR USING INDIAN CORN.

DEAR SIR: If the very interesting pamphlet addressed by you to *Lord Ashburton* in 1842 on the introduction of *Indian Corn, free of duty, into Ireland*, could have had a circulation in England proportioned to the importance of the subject, and the ability with which it was there presented, it could not have failed in making an impression on that Government, and might have gone far to mitigate the calamity under which there is too much reason to fear Ireland is now suffering.

It is, however, an interesting fact to know, that gentlemen are now writing out to their correspondents in this country, to send them small parcels of the nicest samples of *Indian Corn Meal*; and it is important to the last degree, that nothing shall happen to discourage these essays to bring that great staple of our country into popular use in England. Under that persuasion, I think it of some importance not only that measures be taken to accompany these samples with the best culinary instructions, but to suggest, what from the best information I believe to be true, that a little depends on the *region of our country where the corn has been produced.*— The facts which seem worthy of regard as to corn, and which influence its quality for *leavening or lightening, and for keeping sweet*, apply as well to *Wheat* as to *Indian Corn*.

Nothing is better known, than that *Richmond Flour* commands a better price, especially in the South American markets, and other warm climates generally, than flour manufactured *farther North*. Why is this? No machinery can be better, nor manufacture more perfect than that of *Rochester* or *Baltimore!* Yet Richmond Flour will keep better, absorb more water and make more bread; in a word, remain sound longer, and *go farther* when made into bread. The cause of this is to be found, I am well persuaded, in the *drier and lighter* wheat of the Southern growth, and the more *spongy and absorbent* nature of the flour. If we had flour manufactories yet farther South, the flour would be equally as good, and as much in demand, as the Richmond brand, if as well manufactured. But the fact is, I understand, that Northern wheat is heavier than Southern wheat, has more gluten in it, is *moister*, and hence will not keep so long, or make as good flour for the baker. The same thing may be said probably of *Indian Corn*; that, as well as oats, and other Northern grain, or grain grown in *mountainous regions* South, is *heavier* than Southern corn and other grains along the Southern sea-board, which supplies Richmond with wheat. Much of their supply comes from James River and south of it. Now my fear is, that all the experiments made in England and Ireland with Indian Corn Meal, will be with *Northern corn*, going from the port of New-York, heavier and better for stock, but not for men who are to be converted to the use of it. At the City Hotel, where I live, and where the cooking department (as well as all others,) is managed with great care and skill, the corn bread, though much in demand at the table, and judiciously made, is not comparable with such as you meet with on the table of a *Virginia Housewife*. It will be clammy and solid when broken or cut. The cakes too, are adhesive, and not light, porous and open like a honey-comb. In the South, make the "Indian bread" as you may, it will be *light and dry*, mix and bake it as you will.

It is but proper to add, that the suggestions I have here made, of the validity and soundness of which I have no doubt, are the result of a recent conversation with T. J. Randolph, Esq., a grandson of Mr. Jefferson, and who, true to his blood on that subject, was recently a conspicuous member of the Education Convention at Richmond.

The views I have thrown out, are corroborated by the following extract from a recent number of the London *Mark-Lane Express*.

"A Subscriber in your paper of September 15, asks why wheat in the present day becomes injured and rots quicker than used to be the case in remote times, when it was stored away and kept sound for an indefinite period? Could the wheats so stored away have been similar to the kinds now cultivated?" He also inquires, whether the Egyptians and other people in the earlier ages of the world cultivated other than the bearded and many-spiked wheats cannot now be decided, but the Romans were acquainted with both winter (or beardless) wheats and the true spring wheat, which is termed "tremois," or three months, on the Continent, &c., in the present day. The great stores of wheat gathered up with a government influence and for national purposes at the times "Subscriber" alludes to, will be found to have been chiefly in the south of Europe and the north of Africa; and as the wheats of those districts are both harder and tougher in the present day than those of the north of Europe, and also contain less moisture, it is only natural to infer that there was the same coincidence of circumstances in olden times; and as the natural quantity of moisture in wheat will be increased in the north of Europe *to perhaps double the quantity it contains in the south, so also will the chances against its keeping for any long period be more diminished the farther we recede from the tropical portion of the earth*. Moisture therefore in wheat must be considered as one of the principles which tend to its decay; and although artificial means, as kiln drying, may be used for robbing it of a considerable portion of the moisture, yet it does not appear probable that any such process will ever render the soft wheats of the north so well adapted for keeping as the hard and horny wheats of warm countries.

I have only to repeat the expression of my hope that the experiments in England will not be generally on the flour of Indian Corn of northern growth, which would be very unfavorable to success; but if gentlemen sending their articles to their correspondents would procure it from Richmond, or south of the Chesapeake, and with it send a copy of the recipes I have append-

ed to this, for making EGG PONE and VIRGINIA CAKES, I will undertake to promise that they will become the favorite bread at the breakfast table of QUEEN VICTORIA herself, as the Indian Meal *Ash Cake* ever was with GEN. WASHINGTON. It shall even augment the desire which she, and it is to be hoped every Christian human being entertains, to preserve peace and all sorts of kind offices between the mother and the daughter country.

Yours with best wishes, J. S. SKINNER,
Editor of Farmers' Library.

New-York, Dec. 1845.

TO MAKE GRIDDLE CAKES.—Best way to make them is to use milk altogether, instead of water—two eggs, yellow and white, to be allowed for a pint of corn meal—the milk to be a little warmed, and the whole to be well beaten up with a spoon or ladle. There must be milk enough used to make the whole so liquid as that it will *pour* out of the saucepan on the *griddle*—one spoonful of wheat flour, and lard (*pure* butter still better) the size of a walnut.

THE GRIDDLE.—Much nicety is to be observed in the preparation of the griddle, which, as must be well known, is a *flat* round iron concern standing on three legs, and of any size—it must be made not *very* hot, because then it would burn the cakes, and it must be well cleaned and greased while warm, that it may be *perfectly smooth*, so that the cakes may be easily turned, that they may be done *brown* (not burnt) on both sides—to promote their turning easily is the object of adding the wheaten flour. Be it remembered that the dough, or rather, as above directed, must be well beat up and prepared directly before being corked—though it might set an hour—this is mentioned to prevent its being supposed that it, like some other bread, would bear to be mixed over night. The cakes are usually poured on until they spread on the griddle to the size of the bottom of a breakfast plate. You will think this recipe rather prolix, but it is my way in all such cases to be very exact. Better be too particular than to omit any essential item. J. S. S.

EGG PONE.—Three eggs to a quart of meal—no wheat flour—to be made also with milk—water would make it heavy—a spoonful of butter, all well beat together and made up of a consistence thicker than the cakes—too thick to *pour* out—but just thick enough to require to be taken up with a spoon—may be baked like the cakes, immediately after being mixed—must be baked in a tin pan, which must be placed in a Dutch oven, not *too hot* at first, but the fire under it to be increased. The object is to have it begin to bake *at the bottom*, when it will *rise* in the process of baking, become brown on the top, and when put on the table and cut, resemble what we call *pound-cake*. If your friend will exactly follow these directions, and then eat his cakes, or his egg-pone, *hot*, with good fresh butter, he will find that Indian Corn bread is fit for *their persons* as well as *pigs* to eat, the assertion of a corn-law Member of Parliament to the contrary notwithstanding. Divers other preparations of corn and Corn Meal might be given. For instance "hominy and ash-cakes," which a certain *George Washington* had cooked for his own eating to the day of his death. J. S. S.

P. S.—Salt, of course, add as usual, in both cases.

THE POWER OF FASCINATION IN SERPENTS.

THERE is a very general opinion, which has been adopted, even by some eminent naturalists, that several species of serpents possess the power of fascinating birds and small quadrupeds, by fixing their eyes upon the animal, so that the poor victim is unable to escape from his formidable enemy. Dr. Barton, of Philadelphia, published, in 1796, a "Memoir concerning the fascinating faculty which has been ascribed to the Rattlesnake, and other American Serpents," in which he maintains that this supposed power of fascination does not exist, and offers some ingenious explanations of the origin of what he considers a popular mistake. Our readers will, we think, be interested by an extract or two from this work:

"In conducting my inquiries into this curious subject, I endeavored to ascertain the two following points, viz., first, what species of birds are most frequently observed to be enchanted by the serpents? and, secondly, at what season of the year has any particular species been the most commonly under this wonderful influence? I supposed this would furnish me with a clue to a right explanation of the whole mystery.

"Birds have an almost uniform and determinate method of binding their nests, whether we consider the form of the nest, its materials, or the place in which it is fixed. Those birds which build their nests upon the ground, on the lower branches of trees, and on low bushes (especially on the sides of rivers, creeks, &c. that are frequented by different kinds of serpents,) have most frequently been observed to be under the enchanting faculty of the Rattlesnake, &c. Indeed, the bewitching spirit of these serpents seems to be almost entirely limited to these kinds of birds. Hence we so frequently hear tales of the fascination of our cat-bird, which builds its nest in the low bushes, on the sides of creeks, and other waters, the most usual haunts of the black snake and other serpents. Hence, too, upon opening the stomachs of some of our serpents, if we often find that they contain birds, it is almost entirely those birds which build in the manner I have just mentioned.

"The Rattlesnake seldom, if ever, climbs up a tree. He is frequently, however, found about their roots, especially in wet situations. It is said that it is often seen curled round a tree, darting terrible glances at a squirrel, which after some time is so much influenced by these glances, or by some subtle emanation from the body of the serpent, that the poor animal falls into the jaws of its enemy. Is the animal's fear and distress a matter of any wonder? Nature has

taught different animals what animals are their enemies; and as the Rattlesnake occasionally devours birds and squirrels, to these animals he must necessarily be an object of fear. Sometimes the squirrel drives away the serpent, but occasionally approaching too near his enemy,

[Baltimore Oriole defending her Nest from the Black Snake.]

he is bitten or immediately devoured. These hostilities, however, are not common.

"In almost every instance, I have found that the supposed fascinating faculty of the serpent was exerted upon the birds at the particular season of their laying their eggs, or of their hatching, or their rearing their young, still tender and defenceless. I now began to suspect, that the cries and fears of birds supposed to be fascinated originated in an endeavor to protect their nest or young. My inquiries have convinced me that this is the case.

"I have already observed, that the Rattlesnake does not climb up trees; but the black snake and some other species of the Coluber do. When impelled by hunger and incapable of satisfying it by the capture of animals on the ground, they begin to glide up trees or bushes upon which a bird has its nest. The bird is not ignorant of the serpent's object. She leaves her nest, whether it contains eggs or young ones, and endeavors to oppose the reptile's progress. In doing this, she is actuated by the strength of her instinctive attachment to her eggs, or affection to her young. Her cry is melancholy, her motions tremulous. She exposes herself to the most imminent danger. Sometimes she approaches so near the reptile that he seizes her as his prey. But this is far from being universally the case. Often she compels the serpent to leave the tree, and then returns to her nest.

It is a well-known fact, that among some species of birds, the female, at a certain period, is accustomed to compel the young ones to leave the nest; that is, when the young have acquired so much strength that they are no longer entitled to *all* her care. But they still claim some of her care. Their flights are awkward, and soon broken by fatigue: they fall to the ground, when they are frequently exposed to the attacks of the serpent, which attempts to devour them. In this situation of affairs, the mother will place herself upon a branch of a tree, or bush, in the vicinity of the serpent. She will dart upon the serpent in order to prevent the destruction of her young; but fear, the instinct of self-preservation, will compel her to retire. She leaves the serpent, however, but for a short time, and then returns again. Oftentimes she prevents the destruction of her young, attacking the snake with her wing, her beak, or her claws. Should the reptile succeed in capturing the young, the mother is exposed to less danger. For, while engaged in swallowing them, he has neither inclination nor power to seize upon the old one. But the appetite of the serpent tribe is great: the capacity of their stomachs is not less so. The danger of the mother is at hand when the young are devoured; the snake seizes upon her; and this is the catastrophe which crowns the tale of fascination!

"Some years since, Mr. Rittenhouse, an accurate observer, was induced to suppose, from the peculiar melancholy cry of a *red-winged maize-thief*, that a snake was at no great distance from it and that the bird was in distress. He threw a stone at the place from which the cry proceeded, which had the effect of driving the bird away. The poor animal, however, immediately returned to the same spot. Mr. Rittenhouse now went to the place where the bird alighted, and, to his great astonishment, he found it perched upon the back of a large black snake, which it was pecking with its beak. At this very time the serpent was in the act of swallowing a young bird, and from the enlarged size of the

reptile's belly, it was evident that it had already swallowed two or three other young birds. After the snake was killed the old bird flew away. Mr. R. says that the cry and actions of this bird had been precisely similar to those of a bird which is said to be under the influence of a serpent. The maize-thief builds its nest in low bushes, the bottoms of which are the usual haunts of the black snake. The reptile found no difficulty in gliding up to the nest, from which, most probably in the absence of the mother, it had taken the young ones; or it had seized the young ones after they had been forced from the nest by the mother. In either case the mother had come to prevent them from being devoured."

☞ FROM time to time we will publish in the FARMERS' LIBRARY such Tables as may be of practical use on Farms. The following can hardly fail to prove a convenience to almost every Farmer:

PLANTING.

A TABLE *showing the Number of Plants required for One Acre of Land, from one foot to twenty-one feet distance from Plant to Plant.*

DISTANCE. Feet.	Inches.	NUMBER.	DISTANCE. Feet.	Inches.	NUMBER.	DISTANCE. Feet.	Inches.	NUMBER.
1	0	43,560	6	0	1,210	12	0	302
1	6	19,360	6	6	1,031	13	0	258
2	0	10,890	7	0	889	14	0	223
2	6	6,969	7	6	775	15	0	194
3	0	4,840	8	0	680	16	0	171
3	6	3,556	8	6	602	17	0	151
4	0	2,722	9	0	538	18	0	135
4	6	2,151	9	6	482	19	0	121
5	0	1,742	10	0	436	20	0	109
5	6	1,440	11	0	361	21	0	99

A TABLE FOR MANURING LAND.

EXPLANATION.—The following Table is intended as a guide in ascertaining the distance and size of the heaps proper for expending a given number of loads per acre, or *vice versa*. In the left-hand columns is placed the distance of the rows and of the heaps in each row, and at the top of the columns will be noticed the number of heaps intended to be made of each load; the point where the two meet gives the number of loads per acre which will be required for that purpose.

Example 1.—Required the number of loads necessary to manure an acre of ground, dividing each load into 6 heaps, and placing them at a distance of 4½ yards from each other? The answer by the Table is 39½.

Example 2.—A farmer has a field containing 5½ acres, over which he wishes to spread a mixen containing 82 loads of dung. Now 82 divided by 5½ gives 15 loads per acre; and by referring to the Table it will be seen that the desired object may be accomplished by making 4 heaps of a load, and placing them 9 yards apart; or by 9 heaps at 6 yards, as may be thought most advisable.

DISTANCE OF THE HEAPS.	NUMBER OF HEAPS IN A LOAD. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
3 yards	538	269	179	134	108	89½	77	67	60	54
3½ "	395	198	132	99	79	66	56½	49½	44	39½
4 "	303	151	101	75½	60½	50½	43½	37¾	33½	30¼
4½ "	239	120	79½	60	47¾	39¾	34¼	30	26½	24
5 "	194	97	64½	48½	38¾	32¼	27¾	24¼	21½	19¼
5½ "	160	80	53½	40	32	26¾	22¾	20	17¾	16
6 "	134	67	44¾	33½	27	22½	19¼	16¾	15	13½
6½ "	115	57½	38¼	28¾	23	19	16½	14½	12¾	11½
7 "	99	49½	33	24¾	19¾	16½	14	12¼	11	10
7½ "	86	43	28¾	21½	17¼	14¼	12¼	10¾	9¼	8¼
8 "	75½	37¾	25¼	19	15¾	12½	10¾	9½	8½	7½
8½ "	67	33½	22¼	16¾	13¼	11¼	9½	8¼	7¼	6¾
9 "	60	30	20	15	12	10	8½	7½	6¾	6
9½ "	53½	26¾	18	13½	10¾	9	7¾	6¾	6	5½
10 "	48½	24¼	16¼	12	9¾	8	7	6	5½	4¾

MARL.

A LETTER ADDRESSED TO THE AGRICULTURAL SOCIETY OF JEFFERSON COUNTY, GA.

BY J. H. HAMMOND.

We have rarely read any disquisition with as much pleasure as the "Letter" on Marl, from Governor Hammond, which enriches this Number of the Farmers' Library and Monthly Journal of Agriculture.

To designate particular portions of it as worthy of especial regard might imply that others were comparatively less so; whereas we may safely commend the whole to the most careful perusal; but what does gratify us particularly is, the general impression which it cannot fail to make, to the effect that our exhausted lands must now be regenerated, and the old States, if not altogether abandoned, must be redeemed by the exercise and application of *mind to the pursuits of the husbandman!* Mere brute force, however great, mere *drudgery*, however persevering, is unequal to the gigantic undertaking. Industry must not only be untiring, but, to be efficient, it must be *well directed*. As well might we expect the unwieldy giant, altogether unskilled in the use of the small-sword, to prevail against the most accomplished master in the art of fencing, or the latter to avail himself, blindfolded, of that elegant accomplishment, as to expect the mere stolid, uninstructed farmer to use his materials most advantageously without possessing any knowledge of their nature or mode of operation.

For readers in those districts where *Gypsum*, or Plaster of Paris acts, as it does in some portions of Maryland, with great efficacy, we might emphasize that passage in the letter where the author says that one peck per acre, applied to the moistened seed, will probably have as much effect, for one year at least, *as any other quantity*, adding that in the last dry season it had on his land, applied in that way, double the effect of a bushel sowed broadcast. The *cotton planter*, too, will not fail to heed the remark that gypsum applied to the cotton seed at the rate of only one peck to the acre on marled land, increased the product one-third.

We remember, on this point, to have heard Mr. Talbot, of Prince George County, Maryland, a very practical planter of the soundest judgment say, that on some occasion the gypsum which had been applied at the rate of a bushel an acre, being nearly exhausted, he ordered half the quantity to be sowed on the residue of the field; and that in the result he could perceive no difference between that part which was sowed at the rate of one bushel, and that which got but half the quantity. There is in fact yet some mystery to be solved about the action of gypsum, which must be done by some investigating member of a class of men, whom the ignorant and prejudiced find it convenient to jeer at and denounce as "*Book Farmers!*" and what are books, but the printed conversation and disclosures of men, who instead of hiding their lights under a bushel for sinister ends, choose rather to put their experience on paper and let it take form, pressure and circulation for the public good?

Incidentally, too, we derive pleasure from this letter, seeing that it does justice to the merits and services of Mr. Ruffin, who, were it only in his illustrations of the properties and uses of *Marl*, has rendered more benefit to the country than any five hundred mere political speech-makers in it.

At the same time, too, we may be permitted the occasion, not knowing when another may offer, to render slow and feeble justice to an old *Maryland* patriot, who, though it may be but little known to fame, is not the less deserving the small honors which the public seems to pay so grudgingly to *civil* worth. We allude to the agency, many years since, of the late Col. Singleton of Talbot County, Maryland, whose name would be as familiar as it is comparatively unknown, to the general ear, if he had done a tithe as much to exemplify the art of destroying, as he did to advance that of *feeding* his fellow men.

Our own recollections connected with what was done to disseminate a knowledge of the value of Marl as a fertilizer, are, we must confess, but ill defined; but our earliest reminiscences, nevertheless, in reference to Maryland Agriculture, and the means of recruiting her exhausted fields, carry us back distinctly, among others, to Col. Singleton as perhaps, until his day, the first and the only systematic *marler* in that respected and by us ever to be beloved old Commonwealth.

Will some friend "of that ilk," more familiar with what he said and did, give us a sketch of it,

if only in the way of simple justice—better late than never—to a quiet, rural benefactor? Some such brief memorial may serve at the same time to mark the errors, the variations and the progress of improvements which have attended, in our country, the use of one of the greatest resources provided by Nature to stem the current of exhaustion that must ever accompany the tillage of the earth, when not counteracted by art and the means placed by Nature within the reach of the *cultivated and thinking husbandman!*

SILVER BLUFF, S. C., Jan. 5th, 1846.

Dear Sir: I embrace the earliest opportunity my other engagements have allowed me, of fulfilling my promise to comply with the request of your Society, to give them such information as I possess in regard to marl. I am happy to learn that an interest in this matter has been excited in your County, and if in what I am about to say, I shall fail to meet all the inquiries which might be made, it will afford me great pleasure to communicate more fully on particular points, at any time hereafter.

Aware of the strong prejudice existing too generally among farmers against everything *new* in farming, it may not be amiss for me to begin by saying that however new to us marling may have been a few years ago, it is in point of fact one of the very oldest agricultural operations of which we have any authentic record. Pliny, who wrote during the first century of our era, mentions marl as having been long in use among the Greeks and also in Gaul and Britain. He describes pretty accurately the appearance of all, or nearly all, the kinds of marl now known. He even specifies the peculiar effects of each on soils, and states the length of time these effects were supposed to last, which was from ten to eighty years, according to the quality of the marl and the land marled. Varro, who wrote a century before Pliny, mentions having seen fields in Gaul covered with a "white fossil clay," and also describes several varieties of marl as in common use.

Although these writers, because ignorant of the discoveries of modern science, made great blunders in attempting to account for the extraordinary influence exerted by this earth on vegetation, and to discriminate between its varieties, still it is unquestionable that the "*leucargillon*" of the Greeks, the "*fossicia creta*" of Varro and the "*marga*" of Pliny, were no other than the same kinds of marl we find here, and which at this day so many enterprising farmers, both in Europe and America, are actively and extensively engaged in spreading over their fields, and which have been continuously used for that purpose more or less from the remotest ages. Marling, then, is certainly no novelty—no untried experiment, that can for a moment be classed among modern humbugs.

There is no question, however, that the want of chemical knowledge has in time past led to great errors in its application and consequent failures—often to serious injury from its use. When the element in marl which gives it its chief virtue, and also its certain and its probable chemical action on the soil and its growth, were all unknown, every new application of it was to some extent an experiment which might or might not succeed. It is a great proof of its universal value, that so many succeeded as to maintain its reputation and consequent use. Mr. Ruffin of Virginia, was the first in this country to explain on scientific principles the true nature of marl, its mode of action, and the proper manner of applying it, and to carry his theory through the ordeal of successful experiment. He is the founder of the marling system among us, for which he will be long and deservedly ranked among public benefactors. His "Essay on Calcareous Manure" contains everything that is important to know about marl and marling. Throughout my operations, it has been my guide, and it is still, I believe, far in advance of anything that has yet been published in any country, on the subject. If I thought every member of your Society would procure a copy of that Essay, and peruse it carefully, I might close my letter here, by earnestly recommending them to do so. It is with the hope of inducing some of them to do it, as well as to testify my respect for them, by responding to their inquiry, that I proceed.

Marl, as correctly defined by Mr. Ruffin, and now known in this country, is calcareous earth, that is, earth containing lime. The lime found in it is united for the most part with carbonic acid, and is therefore called carbonate of lime. It sometimes contains lime in other combinations, as sulphate and phosphate of lime. Azote has been found in marl also, and magnesia is not uncommon. Besides these, it contains sand and clay in various proportions, and occasionally a green sand highly prized as a manure on account of its being rich in potash. All of these constituents are valuable to the farmer. But it is the quantity of carbonate of lime in it which gives its character to marl, and by which it is estimated when it is called rich or poor.

Nothing is more deceptive in appearance, and the most experienced are liable to great mistakes, if they attempt to estimate its value by the eye, and without employing the proper chemical test. There is a rock found in abundance in your County, and which is of great value for other purposes, that has deceived many. It seems to be a mass of shells; but the fact is, they are only effigies, or casts, from which every particle of lime has been long since washed away, and sand deposited in its place. There is also a fine, soapy earth, usually of a pale ash color, though sometimes darker, that many have regarded as very rich marl. This is what was formerly, and by foreign writers is still denominated clay marl. It seldom contains much lime, and is generally wholly destitute of it even when found in marl beds. This soapy feeling is a very uncertain indication of lime. Where it is observed in marl, it is usually owing to something else, chiefly to magnesia or alumina. A marl is found whiter and harder than the earth to which I refer, but of the same lamellated structure and a somewhat soapy touch, that is exceedingly rich in lime—that at Shell Bluff containing 90 odd per cent. of the carbonate. It yields readily to the knife, crumbles when exposed to a severe freeze, and is altogether the most valuable marl we have. Unfortunately, it is not met with in large quantities in our formation. In our marl beds immense quantities of large shells are generally found. Inexperienced marlers have been known to spread these on their land. But they are of little or no value, unless burned or crushed. They were deposited where they are found before the human race inhabited the earth, and being for the most part sound yet, will yield little or no

lime to the soil in our day. Even the masses of much smaller, conglomerated shells, though very rich in lime, are not among the most valuable marls, unless broken up and pulverized to a considerable extent. There is a marl abounding with us, which to the naked eye seems to be mere sand, that is much more valuable, though it does not contain two-thirds of the quantity of carbonate of lime: mixes at once with the soil and exerts its full influence in a comparatively short period. The most valuable marl, practically speaking, that is found in any quantity at Shell Bluff—and will be found in your marl-beds, for the formation is the same—is composed of very fine shells, scarcely discernible, which are loosely cemented together and readily fall apart. It is of different colors; mostly white, sometimes purplish, yellow, or light brown. The most abundant marl found in our formation is hard and compact, of a gray color, containing 50 to 60 per cent. of lime, and crumbles on exposure to the seasons and in handling.

But, as I have said, the value of marl cannot be estimated by its appearance. Between earth which contains 75 per cent. of carbonate of lime, and that containing 20 per cent. or even none at all, the most experienced are far oftener than otherwise unable to distinguish without using the proper tests. These are so readily to be procured, and in fact the analysis of marl, so far as to ascertain the quantity of carbonate of lime, is so very simple an operation, that the marler should leave nothing to conjecture on this important point. Earth containing any notable proportion of carbonate of lime, will effervesce if thrown into vinegar or almost any acid. But the best test is muriatic acid: a single drop of it will produce immediate effervescence whenever there is carbonate of lime in any marl, it is only necessary to have this acid, a pair of apothecaries' scales with weights, and a wide-mouthed vial. Dry the marl thoroughly on a shovel, over the fire, and pound it in a mortar to a fine powder. Fill the vial about one-third with the muriatic acid diluted with two parts of water to one of acid, and balance it exactly in the scales, with weights of any kind. Then add, very slowly, 100 grains of the powder previously weighed, taking care not to make it effervesce so rapidly as to throw any of it out of the vial. When the effervescence has completely ceased, blow gently into the mouth of the vial, with a common bellows, to expel any of the carbonic acid gas which may have remained in it in consequence of its being heavier than the atmospheric air. Weights to the amount of 100 grains must now be put in the opposite scale to balance the 100 grains of powdered marl put into the vial. It will be found that in consequence of the escape of carbonic acid in a gaseous form, the scale with the vial will rise: put weights into it then until the scales are once more exactly balanced—the number of grains put in the scale with the vial will of course indicate the weight of the carbonic acid that has escaped. Now carbonate of lime contains in 100 parts very nearly 56 parts of lime and 44 of carb. acid. If, then, 44 grains have escaped in your analysis, the specimen is pure carbonate of lime. If only 22 grains have escaped, then it contains but 50 per cent. of carbonate of lime. And so in proportion to any quantity of carbonic acid which may have been expelled. In practice, it will be found most convenient to use 50 grains of the powdered marl. A very few trials will enable the most inexperienced farmer to ascertain in half an hour with sufficient precision the value of his marl. That value depending mainly, as stated, on the quantity of carbonate lime which it contains.

The value of lime for agricultural purposes, is not only established by the experience of all ages, and, so far as we know, of all countries, but must be obvious, when it is known that chemical analysis has detected it as a constituent of every vegetable that grows on the surface of the earth. It is also the chief element of the bones of every animal—even of those that feed on grass only. It is, therefore, not only beneficial, but indispensable to the growth of all kind of vegetation. The all-bountiful Creator has diffused it over the whole globe, as extensively as almost any known substance. But like all His gifts, it has been, for wise and good purposes, no doubt, unequally distributed. That it is placed, in some form and to some extent, within the reach of all plants, is certain, since they all contain it. And a late scientific writer on Agricultural Chemistry in our country, has attempted to prove that all—even the poorest soils, possess an ample supply of it to furnish heavy crops of vegetation for countless years to come. If this were true, it would be worse than useless to expend labor in spreading it over our lands; millions of farmers besides myself have acted very foolishly, and you would do well to think no more of marling. But this is plainly not the case. There are a great many soils in which the chemical tests now known, have failed to find a trace of it. Such is the fact with regard, I believe, to all the land I cultivate. Such, I will venture to say, it is with regard to most, if not all of the lands in your County; though I am aware you have had pretended analyses made, which exhibited large proportions of lime. The reasoning of the writer alluded to, is this: All soils are formed by the disintegration and crumbling of rocks. Most rocks contain lime, especially those which disintegrate most readily and form soils. He calculates the amount of lime in the quantum of rock necessary to create a soil of a certain depth, and thence infers that there is so much lime in the land. There is no doubt that the rocks from which your soil and mine were formed, contained lime to the amount estimated. but it is equally certain that these rocks, in their transition from one state to another, were subjected for an indefinite period to the action of water. I am speaking particularly of our immediate section of country. The ocean once undoubtedly covered it as high up as the Falls of our rivers and the belt of sand-hills which runs through the middle districts of South Carolina and Georgia, and held it as permanent domain. During this period, our marl beds were deposited—possibly also our present surface of earth. But whether that be so or not, and whether the surface we now cultivate belongs to the Eocene formation, as these marl deposits are supposed to do, or to the Post Pliocene, or, as is most probable, to the Diluvial, it is evident, from the irregular inter-stratification of different kinds of earth, and the rounded pebbles on and in it, to a considerable depth, which could have been rounded only by the action of water, that the whole of it, like the sand and clay now constantly brought down our streams, has been at some remote period, "drifted" from a higher region, and deposited by water here. The lime in the rocks being soluble under circumstances which must have attended the "drift." was re-

tained and carried away in the currents. Our marl beds were probably deposited at a much earlier geological era, and have no connection with the soil on our present surface, but were upheaved or denuded in some of those great convulsions to which our globe has been every where subjected. That our lands are for the most part destitute of lime is certain. That it has been taken from them in this way, is more than probable. The masses of silicified shells to which I have already alluded, and which are so abundant in your County, prove that the lime may be entirely carried off by water.

But if there is no lime in the soil, from what source do the growing plants derive this indispensable constituent, may well be asked. It has been often asked. Nature has not revealed, and Science has as yet failed to discover an answer satisfactory to all. Whether, as is conjectured by some, the unknown vital action of the plant is sufficiently powerful and comprehensive to *create* the requisite modicum—or whether it can, as others suppose, by some galvanic agency, extract it from sources where its existence has not yet been detected by chemical reagents, is yet a mystery. But this much experience has established and science demonstrated, that where lime cannot be found in fair proportions in a soil, the health and vigor of the plants growing on it can always be materially improved by a judicious application of it. And to this conclusion common sense, without experience or science, would lead every one who was aware that it is invariably an element in all vegetable matter.

The precise rationale of the action of lime on the soil, and the manner in which it benefits vegetation, has never been fully and minutely explained. Nature still holds many of the secrets of her laboratory undisclosed. Many and many of the most important details of her wonderful processes of composition and decomposition and of the vast play of her chemical affinities, yet await the persevering investigation and penetrating thought of man. I will endeavor to lay before you, succinctly, what is known or rationally conjectured in regard to the operations and effects of lime, so far as may be material to the present purpose.

It is applied to land, either directly or mixed, in compost heaps, and carried out in manure.—But for the additional labor the latter would always be the best method. Where it is used in large quantities, it is much cheaper to spread it at once upon the land, and apply manure, &c. afterward, as circumstances may dictate or permit. It is sometimes put on land in the state in which it comes from the kiln, that is, as quick or caustic lime. Sometimes it is first slaked in water, when it becomes a hydrate of lime. Most commonly it is slaked by mere exposure to the atmosphere, when it assumes the form of carbonate or mild lime, that is, lime combined with carbonic acid, which it extracts from the air in the proportions I have already stated. It is in this form that it is found most abundantly in nature. Sulphate and phosphate of lime are also found, but quick-lime never. The lime in shells, marble, limestone, marl, &c. is usually all of it the carbonate. Its action, however, in the long run, is always the same, whether applied in the mild or caustic state, being dependent on its intrinsic properties as lime. When caustic, it at first rapidly decomposes whatever of vegetable fibre or animal matter it comes in contact with. But its caustic quality is soon exhausted, or rather it soon becomes changed itself by the action of the substances it meets with, and thus loses its causticity. On lands containing a great excess of vegetable matter, such as peat and rich bog, and where rapid decomposition is desirable, quick-lime is the best form of application, if equally cheap, as it saves time, and renders the soil productive much sooner than the carbonate will do it.

Although lime is found most commonly combined with carbonic acid, the fact is owing more to the abundance of that acid which exists in the atmosphere, in water, and is continually rising from vegetable decay, than because it has any affinity for carbonic over other acids. On the contrary, it will yield it up and combine in preference, with almost any other. Not only the strong mineral, but most vegetable acids, even vinegar, as I have before mentioned, will drive it off. The effervescence which takes place when carbonate of lime is thrown into them, is caused by the carb. acid escaping in the form of gas. From this great affinity of lime for all acids results one of its primary and most important effects in soils. Acids are anti-septic and arrest spontaneous decay. Lime combines with them wherever it finds them free from other combinations, and neutralizes their injurious effect. Hence, on lands that we call sour—and on many that are really sour without our knowledge of the fact—all land covered with broom-sedge, for example—it is of inestimable value.—It destroys the sourness, and thereby promotes the decay of whatever matter may have been locked up by acids, which is calculated to nourish useful vegetation. From this quality of lime, it is denominated an Alkaline Earth—alkali being the reverse and antagonist of acid. Whenever an alkali and acid meet, they neutralize one another in certain proportions, and form what is called a salt. For instance, our common salt is muriatic acid, and the alkali soda. So carbonate of lime is, in fact, itself a salt.

These salts, and especially those of which lime is a component part, are of the highest value in Agriculture. Some of them are soluble in water, and these are the most valuable. It is, in fact, only when they are thus dissolved that they afford any direct nourishment to growing plants, which can imbibe nothing by their roots but watery solutions, and are fed altogether in this way from the ground. But the salts which are readily soluble in water are soon exhausted. Every shower dissolves them, and whatever surplus is left after the plants have absorbed the solution to the extent of their capacity, is liable to escape by evaporation, or to be carried by the water into the earth below the reach of vegetation, or to run off with it into the streams. Salts, then, that are not immediately soluble in water, if they can be made soluble gradually, are in the long run the most useful to the farmer. Of this class are most, if not all, of the salts formed by lime. Carbonate of lime is indeed wholly insoluble in pure water, and if lime remained forever in that state it would be of little value in the soil other than its mechanical influence on the texture of it.—But if carbonic acid be added in excess—that is, more of it than 44 parts in one hundred, which are required to make the carbonate, this salt becomes soluble. This excess is in point of fact constantly furnished in small quantities by the air, by rain water, and by the decay of vegetable substances in the ground, and hence, one advantage from keeping lime near the surface.—The lime thus dissolved enters into the plant and feeds it. In this way, and this way only, is it a

direct manure. All its other influences are indirect, on which account it is most generally regarded as a stimulant rather than a manure. I am speaking, of course, of carb. of lime as it exists in our marls, and not the sulphate or phosphate of lime.

Its indirect action, however, is as important as it is varied. I have already said it promotes decay by neutralizing acids. But while lime from its neutralizing power promotes decay, by arresting the influence of acids and giving efficiency to the legitimate agents which accomplish it, it is a watchful guardian over their action, retarding their wasteful haste, and sometimes wholly preventing farther progress for a time.—It expels, for instance, from decomposing substances, ammonia, which is the most active and rapid conductor of putrefying contagion, driving it into the air to descend in future showers, or, if they are at hand, into other substances less advanced in the stages of decay.

The ultimate result of the vegetable decomposition thus judiciously forwarded by lime, is a substance to which various names have been applied by chemists, such as "*humus*," "*geine*," "*ulmin*," &c., which, so far as Agriculture is concerned,—their treatment and influence on the growth of vegetation, are one and the same thing; meaning, substantially, that residuum of decomposition which is familiarly known to us as "*vegetable mould*," without a sufficiency of which, in our soils, we are all aware that compensating crops cannot be made. In the progress of decay the most soluble portions of this mould are exhausted and assume new forms, and what at last remains apparently fixed in the soil is the undissolved sediment. This is said to be wholly insoluble in water, but when plowed up and frequently exposed to the action of the air, it becomes so, sparingly. Yet, without aid from some other source than the atmosphere, water will not furnish it to plants in sufficient quantities for their vigorous growth. Now the alkalies and alkaline earths (lime being the most important of this last class) act directly on this insoluble substance. Their presence—and it is a singular but well known principle in Chemistry, that *mere presence is a power* called catalytic—induces it to absorb oxygen from the atmosphere, and to produce what is called humic acid. With these acids the alkalies immediately combine and form salts called humates, which are soluble in water, and afford nourishment to plants.—Thus when lime is properly applied to land, it brings into fruitful action the hitherto inert vegetable mould.

But it must be obvious that if no additional vegetable matter is given to the soil, the effect of lime will be to exhaust it utterly, in a shorter time than might otherwise be done by cropping. Hence the saying that liming land enriches the father but impoverishes the son. It must not be forgotten, however, that the lime has enriched the father, by giving abundantly to his crops food that would otherwise have remained dead in his soil, or been eliminated by other agents, through a series of years, in feeble proportions, to scant, and therefore profitless crops; while, if it impoverishes the son, it is because a wretched husbandry has taken all from the land, and given nothing in return. The exhausting effect of lime is mitigated, however, by another highly important intermediate condition of the process. As the mould disappears, the proportion of lime to mould of course increases, and the lime becomes excessive. When this is the case, the humate, which before was soluble, becomes wholly insoluble in water. The process of decomposition then ceases for a time. And such is the case very soon, wherever lime or marl, in very large doses, is put on land possessing but little vegetable matter. It is called "marl burnt," among the marlers—many instances of which I can point out on my plantation. In course of cultivation, however, the lime being constantly exposed to the atmosphere, absorbs carbonic acid, which, combining with a portion of it, converts it into carbonate of lime again, and thus freeing the humate, or a part of it, of the excess of lime, renders it soluble once more. But this is a very slow process, and unless there are immense quantities of vegetable mould which have been thus locked up by an extraordinary and injudicious application of lime, and probably even then, the proper plan is to remedy the evil at once, by a heavy coating of vegetable matter brought fresh from the woods.—When this cannot be effected, we should give the land a long and absolute rest, allowing every particle of vegetation it produces to rot upon it, and if it can be conveniently done, to plow it in. The best of all methods, however, to restore the land, and not always the most expensive, would be to add a sufficiency of compost manure. Besides the amount of decayed vegetation which such manure would supply, the alkalies potash and soda are always generated in compost heaps. These act directly on the insoluble humate of lime, decompose it by their greater affinity for the humic acid, and form new salts which are quite soluble.

Instead of objecting to this action of lime in locking up the food of plants, and its constant tendency to do so when that food is not made abundant by good husbandry, we should rather regard it as one of its most valuable properties. The vegetable mould was dead in the soil. It could not be carried away, but it was of little value as it stood. The lime by its presence persuades it to decompose in sufficient quantities to nourish a luxurious growth of plants. So soon as the mould begins to become scarce, the lime confines it in its embraces and preserves it from the wasteful influence of heat and moisture. Yet, to the industrious farmer whose constant furrows give access to the atmosphere, it yields up what a prudent economy would dictate, under existing circumstances, to promote the growth of vegetation. If that vegetation is permitted to remain and decompose upon the land, "vegetable mould," in time, becomes abundant again, and the lime prepares it to furnish ample food for heavy crops once more. If all the produce is taken off, the lime, more provident than the farmer, and more generous too, still preserves what remains in the soil, for the exclusive use of the crop, and doles it out until all is gone.

The influence of lime upon the mineral substances of the earth is scarcely less powerful and important to the farmer than on the vegetable. The chief mineral constituents of the soil are, as you know, sand and clay. They are usually resolved by agricultural chemists into what they call silica and alumina, which are silicon and aluminum, their ultimate principles, with a little oxygen absorbed from the atmosphere. Of these two, silica is much the most abundant, as well, perhaps, as most valuable.—After what we call clay has been deprived of its sand by washing, in which state it is usually denominated pure or agricultural clay, it still

holds in chemical combination from 50 to 60 per cent. of silica. The purest pipe clay we find is half silica; and the stiffest red lands of your County probably contain at least 70 per cent. of it, and not more than 15 per cent. of alumina.—Lime and alumina have a strong affinity, and from their combination and subsequent decomposition results the important and well-established fact that the stiffest clay lands are rendered light and mellow by liming. The rationale of this process has never been satisfactorily explained. The effect is usually referred to the mere mechanical operation of the lime. But this cannot be so, since a hundred, or at most a few hundreds of bushels per acre of one earth could not materially alter the texture of another, to any depth. It is probable that the crumbling of the clay, after liming, will be found to be owing to the condensation, by severe cold, of the carbonic acid supplied by the lime, and its extraordinary power of expansion under the influence of returning heat, since this disinteration of stiff lands has never been observed until a winter has elapsed after the application of lime or marl. Alumina will not combine with carbonic acid; and it may be that clay lands are opened partly by the incessant changes occasioned by the affinity of lime for both. Being insoluble in water, alumina furnishes of itself little or no aliment to the growing plant, though it has other indirect influences fully in proportion to its conspicuous position as a constituent of soils.

Silica, on the contrary, enters largely into the formation of the plant. It has, as I have mentioned, acid properties, and combines with the alkalies and alkaline earths and metals, forming salts of the greatest value in numerous points of view, which are called silicates. It is the silicate of potash, sometimes replaced by that of soda, and to some extent by that of lime, which forms the outer coating of straw, stems, stalks, &c. giving both strength and protection to the plant. These silicates are insoluble in water—so much so that they constitute the chief ingredient of rocks. But that universal and inexhaustible agent, the carbonic acid of the atmosphere, acting on the alkaline bases of the silicates, decomposes them; hence the gradual breaking down of rocks under atmospheric influence.

[*To be concluded in the June No.*]

PRICES CURRENT.

[*Corrected, April 22, for the Monthly Journal of Agriculture.*]

ASHES—Pots, 1st sort	℔ 100 lb.	3	87½	@	—	—
Pearls, 1st sort, '45		4	18¾	@	—	—
BEESWAX—American Yellow		—	29½	@	—	30
CANDLES—Mould, Tallow	℔ lb.	—	9	@	—	11
Sperm, Eastern and City		—	26	@	—	38
COTTON—From	℔ lb.	—	6¼	@	—	10
COTTON BAGGING—American		—	12	@	—	13
CORDAGE—American	℔ lb.	—	11	@	—	12
DOMESTIC GOODS—Shirtings	℔ y.	—	5½	@	—	11
Sheetings		—	7	@	—	15
FEATHERS—American, live		—	26	@	—	31
FLAX—American		—	7½	@	—	7¾
FLOUR & MEAL—Genesee	℔ bbl.	5	37½	@	—	—
Troy		5	31½	@	5	37½
Michigan		5	31½	@	—	—
Ohio, flat hoop		5	31½	@	—	—
Ohio, Heywood & Venice		6	12½	@	6	25
Ohio, via New-Orleans		5	—	@	5	12½
Pennsylvania		—	—	@	—	—
Brandywine		5	37½	@	—	—
Georgetown		5	12½	@	—	—
Baltimore City Mills		5	12½	@	—	—
Richmond City Mills		6	25	@	6	50
Richmond Country		5	12½	@	5	25
Alexandria, Petersburg, &c.		5	—	@	5	12½
Rye Flour		3	25	@	3	37½
Corn Meal, Jersey and Brand		3	25	@	3	37½
Corn Meal, Brandywine	hhd.	15	75	@	16	—
GRAIN—Wheat, Western	℔ bush.	1	18	@	1	25
Wheat, Southern	new	1	10	@	1	15
Rye, Northern		—	73	@	—	74
Corn, Jersey and North	(meas.)	—	67	@	—	68
Corn, Southern	(measure)	—	67	@	—	—
Corn, Southern	(weight)	—	67	@	—	68
Oats, Northern		—	43	@	—	45
Oats, Southern		—	37½	@	—	40
HAY—North River	bales	—	65	@	—	80
HEMP—American, dew-rotted	ton	70	—	@	90	—
" " water-rotted		120	—	@	170	—
HOPS—1st sort, 1845		—	20	@	—	26
IRON—American Pig, No. 1		35	—	@	37	—
" Common		25	—	@	30	—
LIME—Thomaston	℔ bbl.	—	90	@	—	—
LUMBER—Boards, N.R.,	℔ M. ft. clr.	35	—	@	40	—
Boards, Eastern Pine		11	—	@	13	—
Boards, Albany Pine	℔ pce.	—	10	@	—	19
Plank, Georgia Pine	℔ M. ft.	32	50	@	35	—
Staves, White Oak, pipe	℔ M.	50	—	@	—	—
Staves, White Oak, hhd		40	—	@	—	—
Staves, White Oak, bbl		31	—	@	—	—
Staves, Red Oak, hhd		27	—	@	30	—
Hoops		25	—	@	30	—
Scantling, Pine, Eastern		—	—	@	16	25
Scantling, Oak		30	—	@	35	—
Timber, Oak	℔ cubic foot	—	25	@	—	37
Timber, White Pine		—	18	@	—	25
Timber, Georgia Yellow Pine		—	20	@	—	25
Shingles, 18 in	℔ bunch	1	75	@	2	—
Shingles, Cedar, 3 feet, 1st quality		—	—	@	24	—
Shingles, Cedar, 3 feet, 2d quality		22	—	@	23	—
Shingles, Cedar, 2 feet, 1st quality		19	—	@	—	—
Shingles, Cedar, 2 feet, 2d quality		16	—	@	18	—
Shingles, Cypress, 2 feet		13	—	@	14	—
Shingles, Company		—	—	@	20	—
MUSTARD—American		—	16	@	—	31
NAILS—Wrought, 6d to 20d	℔ lb.	—	10	@	—	12½
Cut, 4d to 40d		—	4	@	—	4½
PLASTER PARIS—℔ ton		2	87½	@	3	—
PROVISIONS—Beef, Mess, ℔ bbl.		7	50	@	8	50
Beef, Prime,		5	25	@	5	50
Pork, Mess, Ohio		10	50	@	10	87½
Pork, Prime, Ohio		9	44	@	9	50
Lard, Ohio	℔ lb.	—	6¼	@	—	7½
Hams, Pickled		—	5	@	—	5½
Shoulders, Pickled		—	4	@	—	4½
Sides, Pickled		—	—	@	—	—
Beef, Smoked	℔ lb.	—	6½	@	—	—
Butter, Orange County		—	14	@	—	16
Butter, Western Dairy		—	11	@	—	14
Butter, ordinary		—	9	@	—	11
Cheese, in casks and boxes		—	7	@	—	8
SEEDS—Clover	℔ lb.	—	6½	@	—	7½
Timothy	℔ tierce	11	—	@	16	—
Flax, Rough		9	—	@	—	—
SOAP—N. York, Brown	℔ lb.	—	4	@	—	6
TALLOW—American, Rendered		—	7	@	—	7¼
TOBACCO—Virginia	@ lb.	—	3	@	—	6
North Carolina		—	3	@	—	5
Kentucky and Missouri		—	3	@	—	7
WOOL—Am. Saxony, Fleece,	℔ lb.	—	38	@	—	40
American Full Blood Merino		—	36	@	—	38
American ½ and ¾ Merino		—	30	@	—	33
American Native and ¼ Merino		—	26	@	—	28
Superfine, Pulled		—	28	@	—	30

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